JPRS 75209

27 February 1980

China Report

SCIENCE AND TECHNOLOGY

No. 26

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50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. JPRS 75209	2.	3. Recipient's Accession No.
4. Title and Subtitle CHINA REPORT: SCIENCE AND TECHNOLOGY, No. 26			5. Report Date 27 February 1980 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This serial report contains articles, abstracts and news items on national developments in science and technology; and physical, applied and life sciences in China.

17. Document Analysis a. Descriptors

CHINA
National Developments
Chinese Academy of Sciences
Physical Sciences
Applied Sciences
Life Sciences

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group 01, 02, 04, 06, 07, 08, 09, 11, 12, 13, 20

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited Availability Sold by NTIS Springfield, Virginia 22161	UNCLASSIFIED	70
	20. Security Class (This Page) UNCLASSIFIED	22. Price

(See ANSI-Z39.18)

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

JPRS 75209

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CHINA REPORT

SCIENCE AND TECHNOLOGY

No. 26

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ABSTRACTS

NATIONAL DEVELOPMENTS

ACADEMY OF SCIENCES INCOME RETENTION PROVISIONS NOTED

Beijing GUANGMING RIBAO in Chinese 6 Dec 79 p 1

[Text] Beijing, 5 Dec [XINHUA]--This year, the CAS [Chinese Academy of Sciences] began to practice the method of allowing its scientific research organizations to retain their income.

This is a measure for expanding the autonomy and financial management power of the scientific research organizations. It is a positive factor favorable for uniting the interests of the state, the collective body, and the individuals so as to motivate all aspects fully. When this method is implemented, the research organizations of the CAS can utilize the favorable and available conditions to develop their potential, to expand their financial resources, and to increase their income, under the premises of completing their research responsibilities. A portion of that income may be kept for the use of the respective organization.

According to the regulation, the income of the various scientific research organizations includes the income from sale of products of scientific research, net income of test products and small batches of products, income from extension of fruits of scientific research, income from scientific and technical services, net income paid by factories and plants, income from the sale of accumulated articles and leases of such articles, net income from living allowances, and other incomes. For those organizations whose income is below 50,000 yuan a year, all of it may be retained. For those of annual income more than 50,000 yuan, a ratio is determined to divide it into a portion to be retained and a portion to be delivered to the supervising organization. The portion that is retained may be used for developing scientific research, for a welfare fund of the collective body, and for a fund to award prizes.

For the purpose of encouraging the various scientific organizations to complete their scientific assignments earnestly, to improve their management level, and to increase their receipts, the rule of the Chinese Academy of Sciences for retention of income includes four conditions under which the organization may take a portion from the income for welfare and prize

funds. The four conditions are: The progress plan and completion plan of the current year must have been more than 85 percent accomplished; the income plan of the entire year must be accomplished; the year's experimental manufacture and production plan must be completed; the expenditure of the year must not have exceeded the budget for the year. All organizations that have not met the above conditions cannot retain any portion of their income for the welfare and prize funds. If a portion of the conditions was not met, then a smaller proportion of the income may be retained for welfare and prize funds.

There is an additional stipulation of the regulation. For any organization that has made outstanding contribution in its work, its supervising organization may appropriately increase its welfare and prize funds. With respect to those organizations that have no income or have no sufficient income from which to draw a welfare fund for the collective body or a prize fund [for the individuals], they may request their supervising organization to appropriate suitable sums for these purposes.

6168
CSO: 4008

BRIEFS

HEILONGJIANG SCIENCE PERIODICAL--The science periodical KE XUE SHI DAI--ERA OF SCIENCE--is soon to be published by the Heilongjiang Provincial Association of Writers of Popular Science. This periodical is designed to introduce the newest scientific and technological achievements at home and abroad as well as rudimentary scientific data. [SK080512 Harbin Heilongjiang Provincial Service in Mandarin 2200 GMT 28 Dec 79 SK]

ADVANCED SCIENTIFIC JOURNAL--Beijing, 8 Jan--SCIENCE, a journal aimed at popularizing advanced sciences, will be published by the Chongqing branch of the Scientific and Technological Document Publishing House on 20 January 1980. All of the articles in this journal are translated from SCIENTIFIC AMERICAN, an American journal with a long history and large circulation. The publisher of the journal visited China last June and after consultations with the departments concerned under the State Scientific and Technological Commission, agreed to provide articles to be published in the journal for translation by the Chongqing branch of the Chinese Institute of Scientific and Technological Information. The first issue of SCIENCE will carry articles translated from the ninth issue of 1979 SCIENTIFIC AMERICAN. The journal will be put on sale at post offices throughout China at the price of 1.4 yuan per copy. [OW101383 Beijing XINHUA Domestic Service in Chinese 0130 GMT 8 Jan 80 OW]

NEI MONGGOL S&T PERIODICAL--NEI MONGGOL KEJI BAO [NEI MONGGOL SCIENCE AND TECHNOLOGY PERIODICAL] sponsored by the Nei Monggol Regional Scientific and Technological Association, was published on 1 January. A popular science periodical, NEI MONGGOL KEJI BAO is suitable for workers, peasants, herdsmen, grassroots cadres, students and teachers who have some scientific knowledge. [SK140232 Hohhot Nei Monggol Regional Service in Mandarin 1100 GMT 3 Jan 80 SK]

BEIJING STUDENT SCIENCE GROUPS--Beijing, 10 Jan--More than 400 science groups have been set up in the city's primary and secondary schools to conduct after-school study and experiments under the guidance of some 2,000 instructors. Tremendous efforts are being made in Beijing to train future scientists and technicians from among primary and secondary school children. The most talented youngsters are concentrated in the

Municipal Children's Palace, where 17 groups of children make radios, television sets, model aircrafts and ships, or learn electronics in well-equipped laboratories. The Children's Palace first sponsored such science activities back in 1956. Some of the children who have participated have gone on to play important roles in factories or research institutes, others have attended famous polytechnical schools, including Qinghua University, the Beijing Institute of Aeronautical Engineering, and the Beijing Institute of Posts and Tele-communications. Beijing's scientific, technological and publication departments are all contributing to the endeavour to increase youngsters' scientific knowledge. [OW101523 Beijing XINHUA in English 0122 GMT 10 Jan 80 OW]

CSO: 4008

GROWTH AND CHARACTERISTICS OF LITHIUM NIOBATE PLATE CRYSTALS

Beijing WULI XUEBAO [ACTA PHYSICA SINICA] in Chinese Nov 79 pp 783-791

[Article* by: The Ultrasonic Piezoelectric Materials Group, Ultrasonic Laboratory of the Institute of Physics of the Chinese Academy of Sciences[1]]

[Abstract]

The wetted die technique was used to grow large lithium niobate plate crystals of dimensions reaching 200 mm in length, 20 mm in width, 3 mm in thickness. After testing, their properties were found to be the same as those of cylindrical crystals. To do this work well we tested such physical constants as the density ρ_m of the melt of lithium niobate and its surface tension and obtained the following results at 1270°C:

$\rho_m = 3.57 \times 10^3$ kg/m^3, $\alpha = 204$ dyne/cm; and at 1300°C

$\rho_m = 3.42 \times 10^3$ kg/m^3, $\alpha = 192$ dyne/cm.

1. Introduction

Lithium niobate plate crystals used in ultrasonic surface wave techniques are generally cut from cylindrical (pieces of) crystals at present. It is a waste of work and material. It is often very difficult to cut long crystal plates for use as delayers because of limitations of processing equipment and techniques. For example, to make a 100 μS lithium niobate delay line, the length of the crystal should be about 220 mm. Although cylindrical crystals of such lengths can be obtained (1), to cut them into plate crystals of such a length, an internal circular cutter is required but at present an appropriate internal circular cutter is lacking, and the external circular cutter cannot be used. Thus, the primary significance of directly growing thin and long plate crystals is to better solve the difficulties in processing long plate crystals. The secondary significance is that growing long

*Received on 14 August 1978.

1) It has now been incorporated under the Acoustics Institute of the Chinese Academy of Sciences

plate crystals can reduce cost. Generally speaking, raw material for single crystals is expensive. To produce a useful component, the crystal bar has to be processed many times. This is a waste of material. Productivity is low and the price is high. Growing long plate crystals directly is also beneficial to producing superior quality crystals, for example, because the growth of single plate crystals is fast, the growth boundary is stable, and the composition of the crystal thus grown does not easily change, and therefore thus grown crystals are even and stable.

Reports published in 1975 revealed that lithium niobate plate crystals had been grown to a length of 400 mm (2,3). We have successfully grown several single lithium niobate plate crystals with roots of 200 mm in length by applying the wetted die technique in the study of growing large single lithium niobate crystals. Testing shows the properties are normal. To do the work well, we measured some basic physical constants of the melt of lithium niobate, including the density, surface tension and capillary constant of the melt under two different growth temperatures. These basic physical constants are not only necessary during the growth of single plate cyrstals but are also necessary in growing crystals of other shapes using the wetted die technique. The technique also adds several physical constants to lithium niobate materials.

II. Growth of the single lithium niobate plate crystal

1. Principle and equipment

The technique of growing single plate crystals is the method of growing them within boundary limits. This means limiting the solid and liquid boundary face of the crystals during the course of growth by external boundaries. A die is used as the means. The die is wetted and guides the melt to the mouth of the die. The melt comes into contact with the inoculating crystal at the mouth of the die and crystalizes. The shape of the cross sectional surface of the mouth of the die dictates the cross sectional face of the crystal grown. We call this method the wetted die technique. A similar method being used abroad is called the EFG technique or Stepanov method (unwetted). The difference between this method and the common method of crystal pulling is the addition of a guiding die inside the crucible. The mouth of the guiding die must protrude from the liquid surface of the melt, otherwise the growth of the crystal cannot be limited. The guiding die must also guide the melt in the crucible to the mouth of the die to feed the growing crystal. This function is performed by the capillary action of the capillaries inside the die. The equipment is illustrated in Diagram 1.

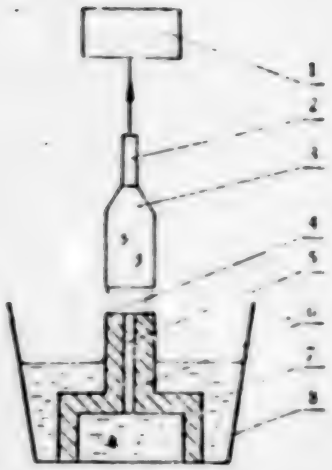


Diagram 1 Diagram illustrating the principle of the equipment for growing crystals

1. Pulling device
2. Inoculating crystal
3. Single plate crystal
4. Solid and liquid face
5. Capillaries
6. Support
7. Melt
8. Crucible

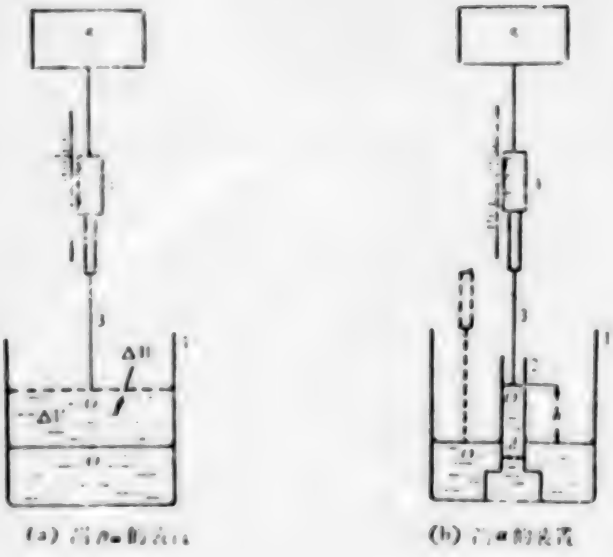


Diagram 2

1. Platinum pot
2. Platinum parallel grooves
3. Platinum probe needle
4. Vernier scale
5. Puller

(a) Device to measure (b) Device to measure

2. Measuring the density and the surface tension of the melt of lithium niobate

To design the die properly and to control the height of the mouth of the die from the surface of the melt, the density ρ_m and the surface tension α of the lithium niobate melt must be known. Thus, we measured these physical constants under temperatures of 1270°C and 1300°C. The temperature zone between these two temperatures is suitable for the growth of single plate crystals. The equipment used to measure ρ_m is shown in Diagram 2 (a). The density was measured by dropping crystalline lithium niobate of known weight into a platinum pot of known capacity and shape and measuring the volume of lithium

niobate which melted. The volume is computed by conversion from the position of the measuring liquid. The position of the liquid is measured by the use of a platinum probe needle with a vernier scale on it. The probe needle has a diameter of 0.5 mm. When the probe needle comes into contact with the melt, it clearly shows a light ring at the place of contact and the position of the surface of the liquid can be read from the vernier scale. The weight of the crystalline lithium niobate dropped into the liquid had been premeasured by a precision scale. Because the items being measured were increases in volume and weight, and because the entire operation was conducted under the same temperature, a series of systematic errors was avoided. The results of the measurements are shown in Table 1.

Table 1 Density and surface tension of the melt of Lithium Niobate ($LiNbo_3$)

Temperature T(℃)	Density of melt ρ_m(10^3 kg/m^3)	Surface tension α(dyne/cm)	Capillary constant a^2(mm^2)
1270	3.57	201	11.7
1300	3.42	191	11.5

Surface tension was measured by the application of the capillary theory of parallel grooves. When a plate of parallel grooves of distance d is placed in a wet liquid, the liquid in the grooves will rise and the height of the liquid columns in the grooves is given by the following formula:

$$h = \frac{2 \cos \Theta \cdot \alpha}{d \rho_m g}, \qquad (1)$$

where Θ is the angle of contact, is the surface tension, ρ_m is the density of the liquid, and g is acceleration of gravity. To use (1) to measure the surface tension, we assume the lithium niobate melt and the platinum are completely wetted, thus the angle of contact is 0°. A parallel groove made of platinum is used to measure the distance of the groove and is placed into the platinum pot and an appropriate amount of lithium niobate is added. After melting, a device illustrated in Diagram 2(b) is used to measure the difference in height h, and the positions of the two columns of liquid in the grooves are measured by the same devices and method used to measure ρ_m. It should be especially pointed out that when the platinum probe needle comes into contact with the melt in the grooves, the light ring appears in a Y shape. This is rarely seen in ordinary crystal pulling. It is illustrated in Diagram 3. The use of the contact light ring to determine the position of the liquid surface is convenient and accurate and highly repeatable. But if visual observation is not convenient, the method of electrical connections can be used. Results of the measurements of α are also shown in Table 1.

(a) Light ring of contact in parallel grooves (b) No contact

Diagram 3

1--Platinum parallel grooves; 2--Platinum probe needle; 3--Light ring of contact

3. Design of the die

The growth of single plate crystals utilizes the die of a parallel plate groove. For this we define the capillary constant of a melt to the parallel groove as

$$a^2 = d \cdot h \qquad (2)$$

Here, d is the distance of the groove, h is the height of capillary rise. Using the values of ρ_m and α already measured, we can obtain the value of a^2 from equation (1). The results are shown in Table 1. The capillary curve of lithium niobate as illustrated in Diagram 4 can be further obtained. This facilitates the design of the die. Material for the die is generally the same as that used for the crucible. The die is placed in the heat center of the crucible. Welding the two together facilitates mechanical stability. If the die is simply placed in the crucible, both can be separated for cleaning and shaping easily. We placed the die inside the crucible. The die consists of three parts. One is the mouth. Its geometric outer profile is determined by the specifications of the crystal to be grown. Its surface is smooth. Its geometric inner profile must be conductive to the inoculating crystal and the melt to make contact. The second is the capillary. It must lead the melt in the pot to the mouth of the die and supply the melt to the growing crystal. It can be seen from Diagram 4 that the smaller the groove distance the higher the liquid can rise. This facilitates full utilization of the material inside the pot. When the geometric dimensions of the crucible are fixed, the distance of the groove is then considered to assure the supply of material corresponding to the amount required by the size of the crystal. The groove should be as narrow as possible. But when inoculating and to prevent the inoculating crystal from touching the mouth of the die, the grooves must be larger than the inoculating crystal. These requirements should be combined in the joint design of the mouth of the die and the capillaries.

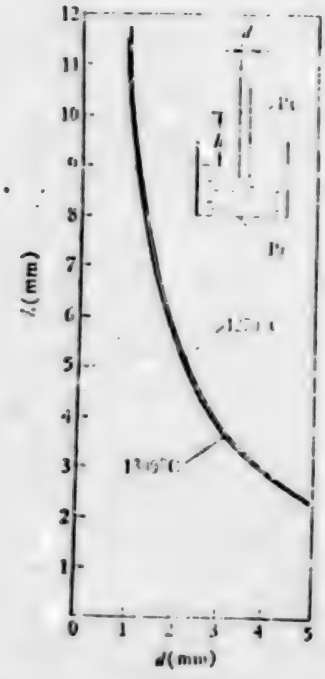


Diagram 4 Capillary curve of lithium niobate

In general, the most appropriate is to use a variable cross sectional design as illustrated in Diagram 5(b). But for the convenience of processing, the curve shown in Diagram 4 can be used for the design of an equal cross sectional design as illustrated in Diagram 5(a). The third is the support which serves to support the equipment. It must be mechanically solid and firm and must assure that the mouth of the die is level. An example of a die is illustrated in Diagram 6.

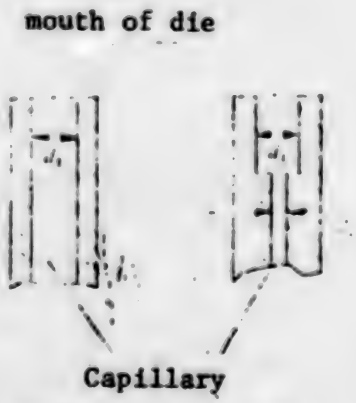


Diagram 5 Key part of the die

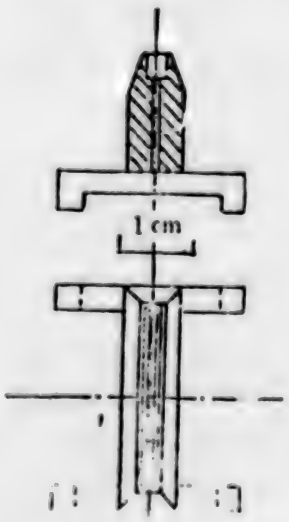


Diagram 6 An example of a die

4. Inoculating crystal

One advantage of growing plate crystals is the elimination of cutting the crystals. This requires that single crystal plates grown must possess a certain directional precision. For this, the inoculating crystal must possess sufficient directional precision and it must be installed correctly to assure precision in movement and the dimensions must correspond to the dimensions of the mouth of the die. The inoculating crystal must be able to enter and exit the mouth of the die easily and therefore the dimensions of the mouth should be made as large as possible. In this way, visual errors can be reduced when inoculating. Three observational windows are used when growing the plate crystal.

5. Position of the material

When pulling ordinary cylindrical crystals, growth is possible regardless of how much raw material there is. When using the wetted due technique for growing crystals, the crucible and the die have already been fixed and too much material will submerge the die and will render the die ineffective. Too little material will hinder capillary action and make effective growth impossible. Therefore the height of the mouth of the die protruding from the surface of the melt, called the position of the material, must be carefully considered. By using the wetted die, the melt can creep upward along the outer side of the die. The height reached by the creeping melt is called the critical height. It is related to the material of the die, the temperature of the die, and the smoothness and cleanliness of the outer side of the die. The critical height reached by the melt of lithium niobate in a buffed platinum die under 1300°C is about 5 mm in tests.

6. Temperature fields and temperature control

The most appropriate temperature gradient of the solid and liquid boundary face of the grown plate crystal is between 50°C/cm and 80°C/cm. The radial temperature field is one that has an isotherm distribution in the same shape as the shape of the mouth of the die. If the die can be placed at the thermal center of the stove, growth will be possible. Otherwise, overheating of one side of the width will easily occur and the crystal will not be able to grow fully or the other side becomes too cold and the crystal and the die will freeze together.

After inoculation, some light rings observed in ordinary crystal pulling methods can also be observed. When the shoulder expands to the same size as the cross section of the mouth of the die, the crystal can undergo isotherm growth and realize equal cross sectional growth. When growing very long plate crystals, temperature control procedures to gradually raise the temperatures for growing long plate crystals should be used to overcome possible mishaps caused by the drop in the position of the melt material and heat diffusion which easily occur when the crystals become long, and the solid liquid boundary face easily becomes overly cooled. The lithium niobate plate crystals which we grew had a cross section of 20 X 3 (mm^2) and a length of 200 mm. The speed of pull was 20mm/hr to 40mm/hr.

7. The pulling mechanism

Generally speaking, any type of pulling mechanism can be used. But because of the problem of positioning of the mouth of the die and the inoculating crystal at the time of inoculation, because the geometric center of the die cannot be guaranteed to be at the thermal center of the stove, because of possible heat distortion of various parts of the mechanism, and because of the possibility of necessity to melt down those crystals which have not grown satisfactorily and which must be pulled again, etc., the inoculating crystal bar should be able to move up and down and should be able to move within a definite area horizontally. For this we used the flotational crystal pulling stove (4) creatively built by ourselves. This mechanism is very convenient in the die technique for growing plate crystals.

III. Results

1. Single yz directional plate crystals of lithium niobate of 200 mm were grown.

In sonic surface wave techniques, yz directional plate crystals are often used. The length is the z axis and the normal line of the plate is the y axis. We used the following conditions:

(1) Ratio of materials, Nb_2O_5: Li_2O = 51.4 : 48.6;

(2) Die: The mouth of the die has a width of 20 mm, thickness of 3 mm, the equal cross sectional groove has a distance of 2 mm, the height of the die is 30 mm and made of platinum;

(3) The crucible: It has a diameter of 60 mm, a height of 40 mm and is made of platinum;

(4) Inoculating crystal: Its yz directional width is 5 mm, thickness is 1 mm and directional precision is 1/3°;

(5) Pulling speed: Between 20 mm/hr and 40 mm/hr.

(6) Temperature gradient: Between 50°C/cm and 80°C/cm.

(7) Position of initial material: 5 mm;

(8) Temperature of the growth point: 1280°C $\pm$ 1°C;

(9) Speed of temperature reduction: 100°C/hr above 1000°C, natural cooling below 1000°C;

(10) Pulling mechanism: Flotational crystal pulling stove.

The successfully grown 200 mm plate crystal of lithium niobate is shown in Diagram 7 (See photographic plate II). It is transparent and does not crack. Its straightness and flatness are $\pm$ 0.1 mm.

2. Evenness

We analyzed the evenness of some samples of plate crystals of lithium niobate we have grown. Three positions were taken, the head which connects with inoculating crystal, the middle part of the plate crystal, and the tail end near the place of pull to analyze the crystals' density, composition, dielectric constant and elastic constant. The results of the tests are listed in Table 2. The small devisions of the data listed in the table are all within the margin of error of the tests.

Table 2 Evenness of the single plate crystal of lithium niobate

Amount of analysis	Head	Middle	Tailend
ρ (10^3kg/m^3)	4.63	4.65	4.65
$\varepsilon_{33}^T/\varepsilon_0$	81	82	82
c_{33}^D(10^{11}N/m^2)	0.75	0.80	0.78
Lithium oxide (%)	49.5	49.6	49.6

Laue photographs were also taken to observe any possible change in the microscopic structure and the quality of control of directional growth. The results are illustrated in Diagram 8. It can be seen from Diagram 8 (photographic plate I) that the results are satisfactory.

3. 57° split

When growing the yz directional plate crystals of lithium niobate, oblique splitting often occurs at an oblique angle of about 57° as illustrated in Diagram 9 (See photographic plate II). We know the atomic density inside the $(10\bar{2})$ face the lithium niobate crystal is large and binding force between faces is small. Cleavage of this crystal face easily occurs and the $(10\bar{2})$ face intersects the crystal face (001) exactly at an angle of 57°. We believe that in the die technique of growing crystals, composition of the solid and liquid boundary face is over-cooled easily, and condensation of lithium and niobium easily occur, causing internal stress. When we adjusted the temperature gradient appropriately and raised the temperature continuously throughout the growth process, splitting could be basically overcome and the normal growth of plate crystals was assured. This kind of 57° splitting may possibly be caused by the production of twin nuclei. The $(10\bar{2})$ face of lithium niobate is often a twin boundary face and twin nuclei of lithium niobate often occur on the characteristic ridge. The characteristic ridge is located at the two sides in the direction of the width of the yz directional lithium niobate plate crystal. In implementing the series of measures to overcome the problems, we believe it is very important to prevent even interference from the smallest mechanical vibration.

4. The basic piezoelectric parameter of the yz directional lithium niobate plate crystal

The goal of studying the growth of the plate crystal of lithium niobate is for application in sonic surface wave techniques. Therefore the plate crystals grown must be subjected to basic piezoelectric parametric tests as much as possible. The basis and results of such tests are as follows.

Let there be a piece of free and infinitely thin 0° y single plate crystal of lithium niobate. Let there be an electric field in the direction of thickness, i.e., direction along y, then a series of body waves can be generated with wave motion equations

$$\begin{aligned}
\rho\ddot{u}_1 &= c_{66}^{E}\frac{\partial^2 u_1}{\partial y^2},\\
\rho\ddot{u}_2 &= \left(c_{11}^{E}+\frac{e_{12}^2}{\varepsilon_{11}'}\right)\frac{\partial^2 u_2}{\partial y^2}-\left(c_{16}^{E}-\frac{e_{12}e_{16}}{\varepsilon_{11}'}\right)\frac{\partial^2 u_3}{\partial y^2},\\
\rho\ddot{u}_3 &= \left(c_{66}^{E}+\frac{e_{16}^2}{\varepsilon_{11}'}\right)\frac{\partial^2 u_3}{\partial y^2}-\left(c_{16}^{E}-\frac{e_{12}e_{16}}{\varepsilon_{11}'}\right)\frac{\partial^2 u_2}{\partial y^2},
\end{aligned} \tag{3}$$

where u_1, u_2 and u_3 are the shifts along the x, y and z axes respectively, ρ is density, C_{ij}^{E} is the coefficient of elastic strength, e_{ij} is the piezoelectric constant, and ε_{11}^{2} is the sandwiched dielectric constant. If the solution of equation (3) is a simple harmonic, then

$$\begin{vmatrix}
c_{66}^{E}-c & 0 & 0\\
0 & c_{11}^{E}+\dfrac{e_{12}^2}{\varepsilon_{11}'}-c & -\left(c_{16}^{E}-\dfrac{e_{12}e_{16}}{\varepsilon_{11}'}\right)\\
0 & -\left(c_{16}^{E}-\dfrac{e_{12}e_{16}}{\varepsilon_{11}'}\right) & c_{66}^{E}+\dfrac{e_{16}^2}{\varepsilon_{11}'}-c
\end{vmatrix}=0. \tag{4}$$

This can be solved for three roots:

$$\begin{aligned}
c_{y_1} &= c_{66}^{E},\\
c_{y_2}, c_{y_3} &= \frac{\overline{c_{11}^{D}}+c_{66}^{D}\pm\sqrt{(\overline{c_{11}^{D}}-c_{66}^{D})^2+4\left(c_{16}^{E}-\dfrac{e_{12}e_{16}}{\varepsilon_{11}'}\right)^2}}{2}.
\end{aligned} \tag{5}$$

Here, $\overline{c_{11}^{D}}=c_{11}^{E}+\left(\dfrac{e_{12}^2}{\varepsilon_{11}'}\right)$, $c_{66}^{D}=c_{66}^{E}+\left(\dfrac{e_{16}^2}{\varepsilon_{11}'}\right)$. It can be seen that two intensified dies can be generated by piezoelectric coupling using a perpendicular field. These are coupled dies resulting from the expansion and contraction of thickness and shearing of thickness, and they correspond to the two effective elastic constants c_{y2} and c_{y3} respectively. Their computed relationship with the antiresonance is

$$f_{n2}=\frac{n}{2t}\sqrt{\frac{c_{y_2}}{\rho}},\quad f_{n3}=\frac{n}{2t}\sqrt{\frac{c_{y_3}}{\rho}}\qquad n=1,3,5\cdots. \tag{6}$$

In addition, the use of a parallel field can generate an unintensified pure thickness shear die wi[illegible] a resonance of

$$f_n = \frac{n}{2t}\sqrt{\frac{c_{66}^E}{\rho}} \quad n = 1, 3, 5\cdots. \tag{7}$$

where t is the thickness of the single plate crystal.

Because lithium niobate is a 3m point group crystal, its dielectric constant is

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}.$$

Therefore, solutions ε_{11}^T and ε_{11}^S can be obtained from $\varepsilon = Ct/S$ by the use of a sample with a perpendicular field and by measuring low frequency and high frequency capacitance. Here, C is the capacitance and S is the area. Based on the above analysis, the plate crystal grown was first polarized and then processed into a thin rectangular plates of parallel thickness of $\pm$ 0.003 mm, directional error of <5', and the length, width and thickness of samples used for generation of perpendicular and parallel fields are respectively: 16 mm, 14 mm, 1.5 mm and 19 mm, 5 mm, 1.5 mm. With a silver electrode, the body wave model shown in Diagram 10 (See photographic plate II) can be generated. Using samples with perpendicular fields, the antiresonance of the coupled intensified dies due to extension and contraction of thickness and shearing of thickness can be separately measured, and the effective elastic strength constants c_{y2} and c_{y3} can be obtained from equation (6). Using the samples with parallel fields, the resonance of the sheared die of inintensified thickness can be measured, and the elastic strength constant c_{66} can be obtained from equation (7). The complete results of the tests are listed in Table 3.

Table 3 Basic physical and piezoelectric properties of the single plate crystal of lithium niobate

1) [illegible]	2) [illegible]	3) [illegible]	4) Warner et al
$\rho(10^3 kg/m^3)$	4.64	4.64	4.64
$\varepsilon_{11}^T/\varepsilon_0$	82	84	85
$\varepsilon_{11}^S/\varepsilon_0$	46	43	43
$c_{66}^E(10^{11}N/m^2)$	0.80	0.78	0.75
$c_{y2}(10^{11}N/m^2)$	0.95	0.94	0.93
$c_{y3}(10^{11}N/m^2)$	2.45	2.49	2.48

Key:
1. Property
2. Directly grown single plate crystal
3. Plate crystal cut from ordinary cylindrical crystal
4. Warner et al(5)

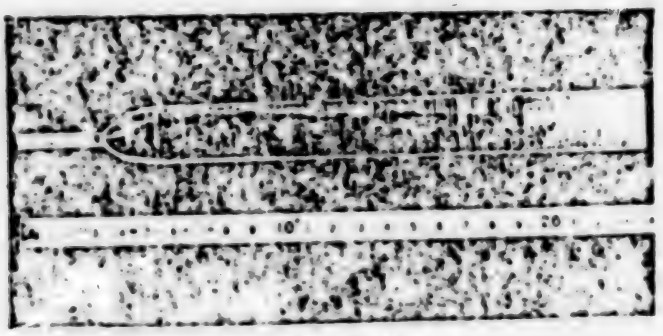
It can be seen in the comparison of the single plate crystal with the single cylindrical crystal that the properties of the plate crystal is normal. Based on the foundations of this work we also launched studies in growing single tubular and cylindrical crystals of lithium niobate by the wetted die technique. The results will be published later.

This work was accomplished under the direction of comrade Yin Chongfu (2019 1504 4395) and with the assistance of comrade Wu Ganzhang (0702 0049 4545). The work also received generous assistance from the institute's plant and 2,4,6 laboratories.

Ultrasonic Piezoelectric Materials Group of the Ultrasonic Laboratory:

Growth and Characteristics of the Single Plate Crystal of Lithium Niobate

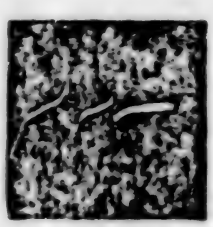
Photographic plate II

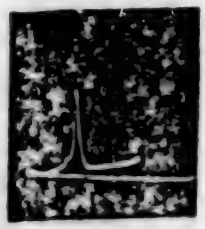


[Best reproduction available]

Diagram 7. Actual image of the single plate crystal of lithium niobate

Diagram 9. Splitting of the yz directional single plate crystal of lithium niobate





[Best reproduction available]

(a) 垂直场激发　　(b) 平行场激发

图10　yz片状铌酸锂单晶的体波模式

(a) Excitation of the perpendicular field　　(b) Excitation of the horizontal field

Diagram 10. Body wave model of the yz directional single plate crystal of lithium niobate

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9296
CSO: 8111

BRIEFS

ANHUI GEOGRAPHICAL MEETING--The 1979 annual meeting of the Anhui Geography Society took place recently in Wuhu Municipality. Three geography professors made academic reports at the meeting. It received 41 theses, reorganized the society's executive committee and elected Professor (Yu Guifen) as the new society president. [OW131651 Hefei Anhui Provincial Service in Mandarin 1100 GMT 5 Dec 79 OW]

CSO: 4008

ACHIEVEMENTS IN ELECTRONICS INDUSTRY NOTED

OW230634 Beijing XINHUA Domestic Service in Chinese 0215 GMT 22 Jan 80 OW

[Text] Beijing, 22 Jan--During the past 2 years since the convocation of the national science conference, China's electronics industry has witnessed a number of fresh scientific and technological achievements. Not long ago, the specialists of the departments concerned, scholars and professors have studied and decided that eight products, including rare earth permanent magnetic material, complex multimode loudspeakers, antenna feeders [tian xian kui yuan 1131 4848 7432 3293], high fidelity loudspeaker testers, and string-control type electronic organs have reached the world advanced level at present. People in the field of electronics and of science and technology at home and abroad think highly of these achievements.

In making the rare earth permanent magnetic material, the No 1,409 Institute of the Fourth Ministry of Machine Building has made use of the abundant rare earth resources in China; improved and made innovations in the original techniques and directions; and turned out this product of fine quality. The total amount of magnetic flux has reached the world advanced level, several times that of magnetic steel made of aluminum, nickel and cobalt alloy. The use of this magnetic material has created new conditions for improving the quality of precision mechanical and electrical products, further reducing the size and weight of such products.

At present, in producing loudspeakers, various countries in the world have relied on the workers' ears to check the purity of audio quality. A worker doing testing must check every loudspeaker from the lowest frequency to the highest frequency. This test is high in labor intensity. The sound is very harmful to the workers doing the testing. In addition, it is hard to set a standard to conduct this audio test.

The high fidelity loudspeaker tester jointly designed by the No 10 Designing and Research Institute of the Fourth Ministry of Machine Building, the Beijing No 1 Radio Appliance Plant, and the Tienjin Electric Voice Appliance Plant has, for the first time, solved the

problem of substituting for the human ear with an instrument in conducting audio tests, and insured stability and accuracy in the tests. Not long ago this instrument won a state invention award, second class.

The string-controlled type electronic organ designed by Tian Jinqin, an engineer of the Taiyuan Radio Factory, has changed the structure of the ordinary key-controlled type electronic organ, with each key generating a musical note independently. It adopts four metal strings to change music scales and to perform portamento, legato, tremolo and others. This kind of electronic organ can be used to simulate traditional Chinese musical instruments such as flutes, pipes, fiddles and spinets. It can also be used to simulate Western musical instruments.

In addition, other new products, such as a piezoelectric ceramic gyrostat, an electronic computer with a speed of 5 million computations per second, and laser and infrared radar have also reached a fairly advanced level.

CSO: 4008

GEOPHYSICAL PROSPECTING FOR PETROLEUM DEVELOPING

Beijing DIQIUWULI XUEBAO [ACTA GEOGRAPHICA SINICA; JOURNAL OF GEOPHYSICS] in Chinese Vol 22, No 4, Oct 79 pp 358-362

[Article by Lu Banggan [7120 6721 1626] and Xie Jianming [6200 0494 7686]]

[Text] Abstract

This article briefly describes the course of development of geophysical prospecting for petroleum since the founding of the People's Republic of China 30 years ago. The article describes in stages the technical achievements and geological results of the work done in western China, the northeast and northern China. It also outlines the views of the authors on the direction of the future development of the techniques of geophysical prospecting for petroleum.

(1) Before Liberation, our nation's work in geophysical prospecting for petroleum was almost nonexistent. There was only one gravity measuring team and a few technicians.

After Liberation and under the leadership of the party and the people's government and simultaneously with the great development of the petroleum industry, the work in geophysical prospecting for petroleum also developed rapidly. A gravity team, navigational magnetism team, vertical electrical detection team, and seismological survey teams were organized. By the beginning of the 1960s, their operation had acquired a definite scale. Because of the characteristics of petroleum prospecting, later emphasis was placed on developing seismological teams. In the 1970s, the number of seismological survey teams for petroleum prospecting had increased to over 200 and their scale of operation was next only to those of the United States and the Soviet Union. Along with the development of geophysical prospecting on land beginning in the 1960s, corresponding developments were made in the exploration of gravitational and magnetic forces and seismological surveying on the sea.

Over the past 30 years, the following work was developed according to plan and in phases:

1. General surveys of gravitational and magnetic forces between 1/500,000 and 1/1,000,000 strength were completed in major sedimentary basins having future oil and gas prospects. Detailed surveys of gravitational and magnetic forces between 1/100,000 and 1/200,000 strength were conducted in a significant number of regions where oil and gas prospects are bright. Along with vertical electrical detection, measurement of geoelectric current and compilation of general seismological survey data, these surveys served an important function in the demarcation of the borders of basins and sedimentary depressions, evaluation of sedimentary depressions and second magnitude tectonic belts, and provided information about regions with good prospects and about tectonic belts for the further development of prospecting work.

2. In geophysical prospecting work, general surveys and detailed seismological surveys of sedimentary basins were conducted as the major tasks. Especially in the eastern regions, seismological surveys were combined with other geological and geophysical surveys. They provided large amounts of information on tectonics or traps and served an important function in the rapid discovery of oil and natural gas fields as well as increased the oil and natural gas reserves. Most of our nation's present oil and natural gas fields have been discovered and drilled according to information gathered from seismological surveys. Over 90 percent of oil and natural gas fields discovered particularly after the 1960s, from the China system to the Fourth system and from the land facies to the oceanic facies, were drilled according to information about tectonics and traps provided by seismological surveys.

(2) Prior to the 1950s, petroleum prospecting was mainly in the west and the situation for geophysical prospecting was very difficult. Land surface conditions encountered included gobis, gravel, desert, loess highlands and mountainous land. The majority of the underground conditions were folded zones in front of mountains. The structure was complex. The geophysical prospecting teams overcame various difficulties and made many achievements. They hiked with camels as means of transport, traveled through the Takla Makan Desert in the famous Tarim Basin and completed the general survey of the routes of gravitational and magnetic forces of 1/1,000,000 strength. Useful information was also obtained from seismological surveys conducted in the Fourth system and the upper Third system of extraordinarily thick gravel (the thickest part can reach 1,000 to 2,000 meters) in the Jiuquan Basin by chain explosions of large amounts of explosives placed in many shallow holes. Information from seismological surveys was obtained in the Xinjiang Gobi, the semi-deserts of northern Shaanxi, and the semi-deserts and semi-loess regions of Ningxia. In the mountainous regions of Sichuan, an entire facility of seismological equipment was separately packed and carried on foot over the shoulders piece by piece into the mountains. This launched the seismological survey work in Sichuan. Many places tested the method of refraction contrasts in studying tectonics and faults and obtained definite results. The work of geophysical prospecting for petroleum also contributed to the detailed exploration and development of the Karamay oil field of that period.

During the latter part of the 1950s, geophysical instruments and equipment for petroleum prospecting developed rapidly and reached a definite scale. The gravimeter, magnetometer, the electric fathometer, the photographic-oscillographic seismograph and drills, etc were developed and the needs of the development of geophysical prospecting for petroleum were quickly satisfied.

During the end period of the 1950s, as the emphasis in petroleum prospecting moved eastward, the emphasis in geophysical prospecting also turned to the east. A large number of projects were launched in the northeast, northern China and eastern China.

The Daqing Oil Field was discovered by drilling shortly after accurate explanatory judgements were made based on comprehensive surveys of gravitational and magnetic forces, electrical measurements of depth and seismic activity in the Songjiang-Liaoning Basin in that period. The good experience of discovering larger oil fields by seismological survey work on a smaller scale was created. In the 1960s, nearly one third of the entire nation's petroleum geophysics workers were joined together to participate in the big battle of conducting detailed surveys of the entire area of the Daqing oil field and the Songjiang-Liaoning Basin. This basin has many swamps and construction work progressed slowly in summer. Later, methods were being sought continuously in practice and gradually a method of construction for seismological prospecting in winter under temperatures of 30 and 40 degrees below zero was developed. Careful selection of instruments and strict construction conditions elevated the quality of the data on seismic key beds. It took only 2 years to complete the seismic tectonic maps of several strata for the entire basin. Tectonic details of the Daqing Oil Field were clearly understood and important information was provided for the prospecting and development of oil fields, and an important foundation was laid for the evaluation of the future prospect of oil and natural gas in the entire basin by discovery of large amounts of tectonics and comprehensive study of the entire basin. At the time, seismic data was also used on a trial basis to study the properties of rocks.

The comprehensive work in petroleum prospecting in the Songjiang-Liaoning Basin was important to seismological survey. It created the experience of rapidly mastering the tectonics of an entire basin by concentrating forces on a large scale to study a large basin under unified planning, unified design and unified construction for conducting detailed seismological surveys of a large area of a continuous piece of land. Later, this whole set of methods was applied many times in Sichuan and northern China and good results were obtained. From that time on, seismological survey developed rapidly in prospecting for oil and natural gas and became a major force in petroleum prospecting.

After 1964, emphasis of petroleum prospecting turned to northern China and a seismological work team even larger than the team that worked on the Daqing project was organized to conduct detailed seismological surveys.

Before this, although breakthroughs were made in the discovery of oil in the regions of north China from seismic information, the seismic information marked out only the tectonic formations of shallow layers not including the key beds. In fact, the faults in the north China region are highly developed. The task of investigating faults in seismological survey brought about much technological development and elevation in the prospecting of oil and natural gas reserves in faults. The first step was to use the detector for aerial combinations, the automatic amplitude controller and selective filter wave frequency bands in a versatile manner to improve the quality of the reflective layer and thus obtain one to two deeper seismic key beds. Later, the technique of overburdening was used many times and the quality of the seismic key beds was further elevated. In the deployment of prospecting forces, the method of anatomizing the tectonic belt of the second magnitude as a whole was used, and to control the formation of the fault, a concentrated measuring network or a small triangular measuring network was set up with devices 500 meters apart. In the interpretation of data, the method of "interference belt contrasting," method of using abnormal waves (diffracted wave and cross-sectional wave), method of "closing of fault surfaces," method of "three dimensional manual resetting" etc were used. Adding these to the propagation of the concepts of geophysical seismology and the study of complex fracture belts and seismological methods to study fractured oil fields which have become more and more mature, they have made their share of contributions to the discovery, detailed survey and development of oil and natural gas fields of the Shengli Oil Field and the Dagang Oil Field. These technical achievements and the multiple burdening technique which achieved its first breakthrough in Jiangsu quickly became popular among other survey areas throughout the nation. They signify a new level in petroleum and seismological prospecting and surveying techniques.

During this period, new progress was also made in seismological methods and techniques in other regions. Construction methods in the Sichuan mountain regions and the Jiangsu Shuiwang area were further perfected. Because of the use of a special cross-river observation system and other construction methods, the lack of information on the areas where passage is difficult like Changjiang and the Yellow River has been overcome. In Hubei, good information on difficult surface regions and villages and townships was obtained by the use of the non-vertical geodesic line measurement and for loess highlands the method of detailed static correction was applied. All of these have contributed toward gathering good seismic information. In addition, a set of operational procedures has been established for seismological studies at sea, from deep sea regions to shallow sea regions to sea coasts. Measurements of magnetic force on the sea and gravitational force at the bottom of the sea have all been developed. Data on the hypocenter of 10,000 meters deep has been gathered by the electric spark hypocenter meter built in our own nation.

Since the mid-1960s, analog magnetic tape seismographs went into mass production and the study and development of the digital seismograph began. Soon afterwards, magnetic band seismographs completely replaced the photographic-oscillographic seismograph. Because of the need for data processing,

the electronic computer to one millionth order of magnitude developed in coordination and cooperation with concerned units also began operation. Input devices specifically for processing seismic numbers, cross sectional drafting instruments and the on board gravimeter have also been developed.

Entering the 1970s and along with the overall popularization of the technique of multiple burdening, the technique of handling seismic numbers and particularly numerical processing of seismic data rapidly developed.

The numerical processing of seismic data of the west of Shanghe in Shandong was a typical example. The geological task led the study of programming, processing and interpretation in close unity. Not only has a set of more complete flow of processing procedures in preprocessing, speed analysis, superimposing and bias shifting been developed, but the quality of the results has been visibly raised. Later, 24 prospecting wells were drilled according to this batch of information and within a period of over 2 years, an area of 53 square kilometers of oil deposits was obtained. Its results were better than those of neighboring regions of similar geological conditions (without the use of numerical processing) (and where 133 prospecting wells were drilled and within a period of over 10 years only 31 square kilometers of oil deposits were found).

After 1974, there were more examples of good results resulting from numerical processing. With the gradual increase in the number of computers built domestically and imported from abroad, the amount of work in numerical processing of seismic data rapidly increased. Precision in the detection of shifts and three dimensional interpretations has been continuously elevated and a group of new types and deeper oil and natural gas fields have been found. For example, the discovery of grey crag of the China system of northern China, the lower paleozoic oil field of Guqianshan and the oil field of the fault strata was obviously the result of seismological studies and seismic numerical processing. Some of the areas of oil deposits of Guqianshan are only one or two square kilometers and some of the oil deposits of fault strata are only several meters in width. Successful drilling and prospecting of these require very accurate seismic prospecting data. Again for example, in the mountainous regions of Sichuan, the capabilities of seismological studies of tectonics of many faults and abrupt strata have been greatly raised because of the application of numerical processing. These capabilities have provided reliable information concerning the situation underground in eastern and southern Sichuan where hidden high yielding natural gas fields have been discovered. Diagram 1 shows a cross sectional diagram of a complex tectonic structure running through eastern Sichuan. The cross sectional topography at its worst section can vary by over 1,000 meters at most within 2 or 3 kilometers. After detailed static correction and bias shifts, a reliable cross sectional diagram of a tectonic structure complicated by three faults and strata with angles of inclination partially reaching 50 to 60 degrees can be obtained and proven by drilling wells. In addition, actual examples of good results have been obtained by numerical processing in Shandong, Jiangsu, Hubei and on the sea. The needs of petroleum prospecting have greatly pushed forward the development of seismic numerical techniques.

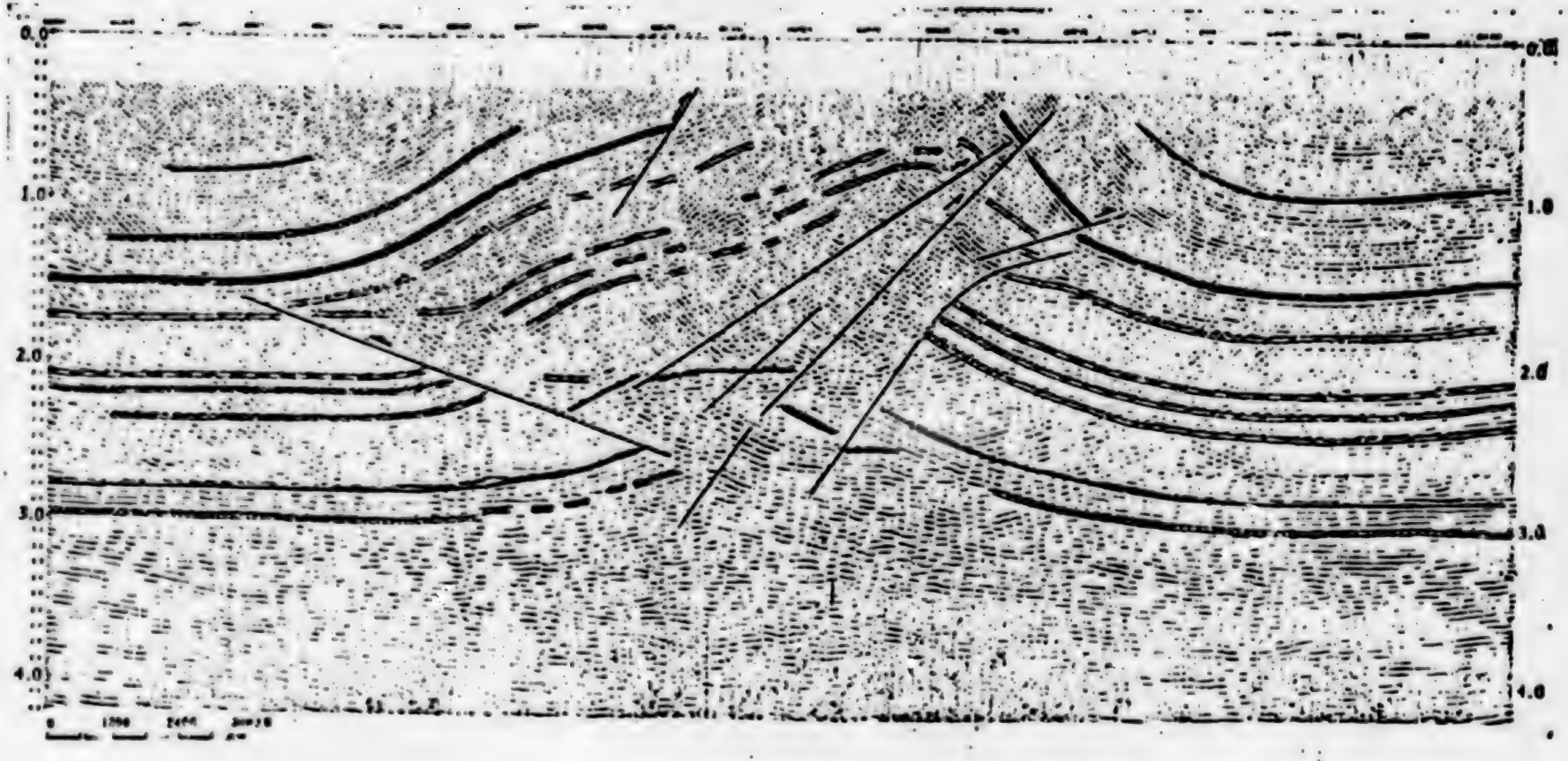

Diagram 1.

In popularizing seismic numerical techniques, the field of geophysical prospecting for petroleum received even more cooperation from related academic institutions and schools, research units, factories and enterprises. They coordinated and cooperated in theoretical guidance, training of personnel and research and development of equipment and served an important function. Now, all major prospecting regions have established computer stations. Some have improved upon and utilized such means of processing as detailed speed and frequency studies, reverse convolution, automatic static correction, superimposing and bias shifting of wave equations to establish a regular library of processing programs roughly parallel to the international levels of the early 1970s in this field. Progress has also been made in the programming for the development of curved geodesic lines, three dimensional data processing, testing of the properties of rocks and oil and natural gas and seismic models. Recently the sign bit theory has been introduced into numerical processing of seismic data. Based on this foundation, studies were made and the automatic accession of speed by horizontal superimposing and formation of speed spectrum by bias shift superimposing were developed. These efforts enabled these processing methods which require large amounts of computational work to be produced and utilized in medium sized computers. This has definitely served to shorten the processing cycle of seismic data and to obtain accurate and repetitive partial speeds.

At present, seismological teams on land and at sea are equipping themselves step by step with domestically produced and imported numerical (data) gathering systems. Domestically manufactured small sized processor of columns of numbers have already been used in some computers. Work at sea has popularized such non-explosives as electric sparks, air rifles and steam guns as hypocenters and for burdening of 24 times. On land, the technique of burdening 12 times is being popularized except in the few areas where construction work is difficult. Domestically manufactured cables for oceanic seismic detectors and remote control detonators have all been successfully popularized.

(3) During the 30 years since Liberation, our nation's workers in geophysical prospecting for petroleum have made important contributions to the development of our nation's petroleum industry. In the future, they will make even greater contributions towards modernization of geophysical prospecting for petroleum and hastening the increase in oil and natural gas reserves.

At present, we must exert efforts in technological reforms centered around digitization. A big step forward must be made in technical equipment, numerical processing and scientific research to raise the effectiveness of prospecting for oil and gas reserves in the earth's strata and tectonic structures complicated by various underground and surface conditions and to adapt to the task of petroleum prospecting which is becoming more and more difficult and more and more complex.

Simultaneously with efforts to hasten the popularization of the system of gathering numerical seismic data, high resolution and multi-channel wired or wireless remote seismological surveying systems, numerically controlled systems for gathering seismic data, and numerical electric fathometers, etc should be developed.

The medium and small computer stations that exist at present must be continuously perfected and a group of medium and large computer stations must be developed. The programs of routine processing must be perfected and automated, and their superiority maximized, and new processing programs (such as for accurate and high speed bias shifts of wave equations, testing the property of rocks and oil and natural gas surveying) must be developed and gradually adapted for practical application and regular application. And the application of joint operations between man and machine must be expanded to develop numerical processing for measuring gravitational and magnetic forces and for electrical measurements of depth.

The amount of work involving the use of the techniques of geophysical prospecting for petroleum in the search for non-tectonic oil and natural gas reserves must be increased. Geophysical prospecting, testing of wells and geological work and related fields of work should be joined together to strengthen stratigraphical research and interpretation. Composite seismic recording, cross sectional and composite sonic impedance logging curves and seismic models must be developed to examine the parameters of the properties of rocks, oil, natural gas and oil strata so that geological interpretations of the results of seismological surveys can be more profound. At the same time, other geophysical methods must also be taken into consideration (such as the method of geoelectric magnetism and the method of excitation and polarization) in the study of testing for oil, natural gas and properties of rocks.

In scientific research, work of tackling the key problems in the techniques of seismological surveys of the exposure of carbonate strata of our nation's southern regions and the developing regions of Karst topography must be launched. Three dimensional seismological surveys must be studied, especially these involving the methods of work and the best information processing plans for complex tectonics and regions where ordinary methods are limited. Studies must be made of the capabilities of joint utilization of vertical and horizontal waves, of raising the capabilities to differentiate thin strata, and of examining the properties of rocks and the properties of fluids in the cavities in the strata. Different schemes of the theory of wave equations to describe bias shifts and bias shifts in frequency zones must also be studied.

In retrospect over the past 30 years, we are full of pride. In looking towards the future, we are full of confidence. In the course of realizing socialism's Four Modernizations, all workers involved in geophysical prospecting for petroleum will surely make more contributions toward the development of our nation's petroleum industry.

9296
CSO: 4008

BRIEFS

SHANGHAI POPULARIZES COMPUTERS--Shanghai, 4 Jan--Shanghai No 13 Radio Plant has taken practical measures to help its customers with the familiarization and operation of electronic computers. As a result of such measures, 300 units of the various departments in the country are now using electronic computers produced by that plant. The measures taken since the beginning of 1979 include running technical training classes at the plant for customers, holding technical exchange meetings in various places, making maintenance visits to units using the plant's computers, assisting customers with operationing problems and printing and distributing technical reference materials. [OW081431 Beijing XINHUA Domestic Service in Chinese 0240 GMT 4 Jan 80 OW]

TIANJIN TELEVISION SET PRODUCTION--Tianjin, 7 Jan--A Chinese designed production line for assembling black-and-white television sets recently has gone into operation at the Tianjin Radio Factory. The line assembles a set every 2 minutes, and turns out more than 60,000 12-to-19-inch TV sets a year. Designed jointly by the factory and the Tenth Designing Institute of the Fourth Ministry of Machine-Building, it is 470 meters long, occupies an area of 1,600 square meters and is operated by 200 workers. [Text] [OW071513 Beijing XINHUA in Enblish 1156 GMT 7 Jan 80 OW]

COMPUTER THEORY DISCUSSION--Guangzhou, 18 Jan (XINHUA)--Feng Kang, a research fellow at the Computing Centre under the Academy of Sciences of China, presented a paper on "Differential and Integral Equations and Finite Element" at the first annual meeting recently held in Guangzhou of the computational mathematics section of the Chinese Mathematical Society. Experts said that the finite element is an advanced method developed independently by Feng Kang almost simultaneously with Western mathematicians. The finite element method is universally used in computers throughout the world. It offers a way of solving computational problems in large-scale project designs and scientific experiments. The method can help improve the design and reduce costs. The annual meeting was attended by over 200 mathematicians from the Academy of Sciences of China and from other organizations. 198 papers were presented at the meeting. [Text] [OW180849 Beijing XINHUA in English 0728 GMT 18 Jan 80 OW]

CSO: 4008

CONFERENCE REPORTS ON PREVENTION, CURE OF SCHISTOSOMIASIS

Beijing GUANGMING RIBAO in Chinese 26 Dec 79 p 1

[Text] Shanghai, 25 Dec [XINHUA]--China has accomplished a great deal in the prevention and cure of schistosomiasis. In the past 2 years snail extermination in regions of South China was extended further in an area of more than 300 million m^2; more than 700,000 victims of this disease were treated and restored to health, and the disease was basically eliminated in more than 30 counties (cities). By now, after more than 20 years of effort, the problem of snails has been resolved in more than two-thirds of the areas where such a problem existed and more than two-thirds of schistosomiasis victims in China have been cured. The disease has been basically eliminated in about 200 counties (cities). This was the information given by the Schistosomiasis Prevention and Cure Work Conference of 13 provinces, cities, and autonomous regions recently held in Shanghai. Participants of the conference believed that a key stage of the schistosomiasis prevention and cure work has now been reached and should be carried out directly to completion.

Peng Chong [1756 3095], a committee member of the Central Politburo of the Chinese Communist Party and the head of the leadership team of schistosomiasis prevention of the Central Chinese Communist Party, chaired this conference and delivered an important speech.

Peng Chong said: "The epidemiological factors of schistosomiasis in China are complex, as the disease prevails in very large areas. In the past, when it was basically eliminated in some areas, an ideological laxation occurred. Some even dismantled the organizations and dismissed the teams working for its prevention. As a result, residual snails spread and the disease turned from mild to severe." He pointed out that the schistosomiasis prevention work must be carried out scientifically to fight for a scientific breakthrough. The function of scientists and technicians must be fully utilized to produce new and effective methods and technical measures continuously. These scientific and technical skills should be given to the masses and special teams of schistosomiasis prevention workers to continue to raise their ability of fighting this disease. He pointed out with emphasis that in order to do a good job of all the above, it is

necessary to strengthen the leadership of the party so as to motivate the masses fully and develop the usefulness of the related departments fully. The party committee should include this item of work in the agenda of its daily meetings for the leader to personally look into. Right now, it is early winter, a time for the various areas to combine the snail extermination work with field water conservancy construction. This slack period at the farms should be utilized to treat the sick and to carry out intensive programs of schistosomiasis prevention work.

Qian Xinzhong [6929 0207 1813], deputy chairman of the leadership team of schistosomiasis prevention of the Central Chinese Communist Party, also spoke at the conference. He said: "The matter of elimination of schistosomiasis involves a change of habits and tradition. It is a struggle to reconstruct nature and it involves tens of thousands of families. Obvious effects can be obtained only if the masses join their minds and efforts for an extermination battle with concentrated forces. The provinces and regions and counties should make plans seriously. In areas of severe snail damage, on the basis of regular prevention and treatment work, favorable opportunities should be seized every year for several concentrated blasts to extinguish the disease."

Responsibilities for the coming year were assigned at the conference for snail extermination and schistosomiasis treatment, with the goal of basic elimination of this disease in another group of counties (cities). Meanwhile, in those counties (cities) where it has been basically eliminated, work should be carried out to stabilize the results.

During the conference, the delegates exchanged information concerning the various localities. They visited the Renyang Commune of Changshu County, Jiangsu Province, and inspected the schistosomiasis prevention work at Meicun Commune of Wuxi County to learn the ways of that commune in changing the reproductive environment of the snails during farm construction, in managing sewage, and in the experience of regular work of preventing this disease. They also visited the Jiangsu Provincial Institute of Schistosomiasis Prevention and Treatment to understand the research work being carried out there and to direct its work of prevention and treatment.

Participants of this work conference included members of the schistosomiasis prevention leadership teams of thirteen provinces, cities, and autonomous regions of South China, cadres of related provinces, cities, and autonomous regions, and leaders of related departments of the State Council, those in charge of the Schistosomiasis Prevention Office, secretaries of local committees of some areas, and representatives of research scientists engaged in schistosomiasis prevention work. There were a total of 74 persons present.

6168
CSO: 4008

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

NEW BRANCH ACADEMY VICE PRESIDENT APPOINTED

Beijing GUANGMING RIBAO in Chinese 11 Dec 79 p 1

[Text] Urumqi, 10 Dec [XINHUA]--Peng Jiamu [1756 0502 2606], a researcher of the Institute of Biochemistry, Shanghai Branch, Chinese Academy of Sciences, has, most recently, been appointed vice president of Xinjiang Branch, Chinese Academy of Sciences.

Scientists in Xinjiang believe that science and technology in that border province are weak, and it is worthwhile to assign scientists of inland regions to Xinjiang to work a specific period of time to help promote the development of science and technology in this border region.

After Peng Jiamu arrived at Xinjiang last July, he was accompanied by local scientists and technicians to inspect the condition of plant virus of melons, fruits, corn, wheat, etc. Some crop virus pathogens were discovered and preventive measures adopted. Currently, he is carrying out a scientific observation tour of the site of the ancient city of Loulan which had been buried by sand since the time of the West Han Dynasty.

In the 1950's, Peng Jiamu performed some biochemical surveys and research work in Xinjiang and had an excellent achievement record. He loves this border province and has already trained a group of scientists and technicians for the province.

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CSO: 4008

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

NOTED OPTICS SPECIALIST ADMITTED TO PARTY

Beijing GUANGMING RIBAO in Chinese 14 Dec 79 p 1

[Text] Gong Zutong [7895 4371 0681], China's famous optics specialist, the head of Xian Institute of Optical Precision Instruments, Chinese Academy of Sciences, has most recently been approved by the Central Chinese Communist Party Shaanxi Provincial Committee to join the party.

Gong Zutong is 75 years old this year. He has been performing scientific research work for nearly 50 years, being one of the forerunners of China's optical sciences. Before the liberation, he made important contributions to the research and manufacture of China's first binocular field telescope. After the liberation, he was successful in making China's first batch of optical glasses. Later, under his guidance and organization, related research departments succeeded in making China's first electron microscope, infrared night vision telescope, high-speed camera, 60cm astronomical telescope, and plastic self-focusing microscopic lens, etc. He also authored a number of books on optics.

After smashing the "gang of four," Gong Zutong has been in good spirit and working intensely night and day in scientific research. He has stated that he wants to dedicate his life to the realization of China's Four Modernizations under the guidance of the party.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

CHINESE METAL PHYSICIST TO LECTURE ABROAD

Beijing GUANGMING RIBAO in Chinese 14 Dec 79 p 1

[Text] Professor Ge Tingsui [5514 1656 3606], noted metal physicist, vice president of the Institute of Metals and member of the Academic Affairs Committee of the Chinese Academy of Sciences, went to Japan after spending 1 week lecturing in Norway. He is now touring and lecturing in Japan.

For more than 1 year, Ge Tingsui led younger scientists to bring about delightful achievements in the research work on internal loss due to anomalous displacement. The Third European Conference on Internal Loss in Solids and Supersonic Attenuation, held in England in July of this year, invited him to give a report of his research results. Scientists all over the world were impressed by it. After the conference, letters of invitation to lecture were received from France, Italy, Switzerland, Austria, and Norway, and he accepted the invitations. An academic organization of Japan also invited him to participate in the International Conference of Hydrogen in Metals and to observe and lecture in Japan after the conference. The organizational committee of the Seventh International Conference on Internal Loss in Matter and Supersonic Attenuation has specifically asked him to be a member of that committee.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

WORK, ACTIVITIES OF NOTED PEDOLOGIST DISCUSSED

Hong Kong ZHONGGUO XINWEN in Chinese 14 Dec 79 pp 8-9

[Article by Yi Wen [1355 2429]: "Professor Hou Guangjiong at Yibin"]

[Text] After attending the national People's Congress this summer, the famous 74 year-old pedologist, Professor Hou Guangjiong [0186 0342 3518], hastened to go to the Yibin area of Sichuan in order to open a training class for the technical personnel in preparation for a general soil inspection and also to continue his research work, working day and night, unmindful of himself.

It's been more than 50 years since Professor Hou first started his research work on pedology. During the latter half of his life, he spent nearly 20 years trying to combine the pedological research work and the experiences of the hundreds of millions of farmers over several thousands of years who depended entirely on heaven, the earth and agriculture. He was finally able to reveal the secret of the soil and formulate the theory of "bio-thermo-dynamics" concerning soil fertility, creating the condition of "all schools contend"in the field of pedalogy, thus contributing significantly to the development of pedology in this country. Today, this old scientist of more than 7 decades, more than ever conscious of the value of the precious time of his life, continues to toil diligently for the early realization of the Four Modernizations by fighting for minutes and seconds.

It was the day after his arrival at Yibin when we visited this old scientist. On that day, he was just studying the matters related to the opening of a second class for the training of the technical personnel in preparation for a general soil inspection and the problems related to how a piece of dry land 1.2 million mu in area north of the river in the Yidin area may be saved from drought and realize a full harvest. He listened intently while everybody else spoke, and kept writing in his notebook. He said that drought is the greatest obstacle which prevents rapid development of agricultural production, not only in the Yibin area, but also throughout Sichuan Province the entire nation and even the entire world. It is a tough problem which has not yet found an easy solution. The general soil inspection must be carried out in conjunction with the research work and other measures aimed at solving

this type of practical problem encountered in the agricultural production process. It must stand on the ground of increasing the production of this year while keeping an eye on the long-range plan so that the ultimate goal of "large area, large scale, speedy equilibrium, high yield, steady yield, and high quality at low cost" may be realized. In his talk, he emphasized the word "speedy." He suggested that 2 months, August and September, be spent on the preparation for the battle, investigating the cause of drought and seeking measures to solve the problem, and making agricultural division in order to bring the scientific research work to fruition as soon as possible.

We were greatly impressed by the spirit of the old professor and his unending enthusiasm.

The second training class in preparation for a general soil inspection of the Yibin area was to be held in Fuchun County of Sichuan Province. Professor Hou was even busier after he arrived in Fuchun make thorough preparation for the training class. First of all, he conferred with the persons in charge of the county departments of agriculture, forestry, irrigation and weather in order to understand the geographic topography, climatic changes, cultivation techniques, and various other related factors of the area in detail so that he might be able to help the county draft a preliminary plan for the countywide agricultural division based on the local situations. The plan could then be used as a pattern for each county to follow and learn in the training class. He also visited the communes and the production teams to carry out on-site inspection and study and to summarize the high-yield experiences. He has thus made preparation and arrangements for the training class in a highly organized fashion minute in detail. In those days, he slept only 3 or 4 hours each day. His work schedule was so densely packed that he scarecely had time to rest. We heard from those who worked closely with him the following stories.

A pedologist is always with the soil. Throughout his life-long intercourse with the soil, hurrying here and there through the months of the years over the mountains and the rivers, living an outdoor life for an extended period of time and eating irregularly, Professor Hou has been suffering from severe stomach trouble. The old professor struggled stubbornly with the disease on the one hand, and fought for time to do work on the other hand.

Since arriving at Fuchun, Professor Hou fought even harder for time, neglecting food and sleep. At first, he would get up at 0600, and while listening to the news broadcast would do health enhancement massage for an hour. Since the training class began, the time for the health enhancement massage has been cut short. At noon, he has never taken a nap. When tired, he would just doze off sitting in a chair. His evening hours are even more packed with work. He would, after finishing his research work, grab time to prepare lessons and handle correspondence, and keep record of the day's important events until very late into the night. Those who worked closely

with him said: "It is understandable that Professor Hou would like to do as much work as he could in his living days, but it worries us greatly how he does it without giving any consideration to his health!"

Professor Hou is sufficiently enthusiastic about passing scientific knowledge to the people and the masses with everything he can. He equates giving lessons to the masses with an important event of raising the scientific and cultural level of the entire nation. He considers it as one of his important personal missions that need to be accomplished. He taught classes in person in both training classes for the general soil inspection personnel of the Yibin area. He instructed in person, often taking the class to the field, identifying the mother rock, differentiating the soil qualities, and collecting samples. He organized 15-16 field study trips and trained more than 400 technical personnel in each class. When he prepares a lesson or gives a lecture, the old professor does not finish it superficially. He would confer with the associates ahead of time in order to prepare the outline, paying attention to choose examples relevant to the local situation, making it generally and easily understandable. When he heard of the People's No 2 team of the Baoqing Commune and how they have achieved high and steady yields for 9 years in a row through reform in soil and cultivation techniques, achieving per mu increases in grain production of 135 jin each year, reaching an annual per mu yield of 1,718 jin last year, he had to visit this production team. A round trip to the said production team from Fuchun requires more than 200 li [5478 6849] by car and 14 li [5478 6849] on foot through muddy fields and rugged mountain paths. Disregarding the difficulty of traveling due to the fact that one eye is blind and the other highly near-sighted, Professor Hou especially paid a visit to the production team, collecting and inspecting the soil samples, conferring with the cadre members, and translating the experiences of the team into scientific language, which he transferred to the masses through his lectures. On the first day of the training class which opened at Fuchun in which Professor Hou taught, the commissioner of the Yidin area and a number of county leaders, together with the cadres of the country and the area, all attended his lecture. Professor Hou, full of spirit, delivered his lecture in a lively, deeply penetrating manner, yet expressing hinself understandably, with cause and event intermingling in perfect harmony. Everyone felt that the lecture was understandable, memorable and applicable. On ordinary days, Professor Hou has never refused an interview to someone paying a visit to learn from him, no matter how busy his schedule may be, explainly carefully and with patience. People around him who worried about him, not wanting to put too much burden on him, once suggested that there was no need for him to see everyone in person, or give lectures in person. His lessons could be recorded and then played back. He said: "People who come from afar come not to see me, but to listen to my explanation. What is wrong in teaching just one more person? Handing out a scientific weapon to the masses is what I must continue to do!"

Professor Hou told us that the general soil inspection of the Yibin area is equivalent to a battle of "eliminating disorder and regaining order" on the

agricultural front. It is a battle or reorganization. It must be done swiftly, as in fighting a fire, by mobilizing all personnel engaged in work related to forestry, irrigation and weather to carry out a multi-disciplinary joint battle in order to achieve high speed and high quality. Every effort must be made to finish the task by next year.

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OCEANOGRAPHIC SYMPOSIUM HELD IN GUANGZHOU

Hong Kong ZHONGGUO XINWEN in Chinese 13 Dec 79 p 2

[Article: "Chinese Oceanographic Scientists Held Symposium in Guangzhou; Survey Results of the Central South Sea Area Discussed"]

[Text] Guangzhou, 12 Dec--Zhongguo Xinhuashe--The Oceanography of the South Sea Institute, Chinese Academy of Sciences, has concluded a general survey of the ocean near the Zhongsha and Xisha archipelagos in the South Sea. It has gathered a large volume of first-hand materials and compiled a series of theses and reports. A symposium on the general survey results of the central South Sea area was held recently in Guangzhou under the auspices of the Oceanography of the South Sea Institute. More than 200 oceanographic scientists from all over the country attended the symposium, and all participated in the discussion of the results obtained from this epochal undertaking.

The general survey of the ocean in the neighborhood of the Zhongsha and Xisha archipelagos in the South Sea was launched in July 1977. In the 2 years since, the scientists and the crew of the Oceanography of the South Sea Institute went out to sea 7 times to carry out a general survey of the ocean area, spending a total of 264 days, a total run of more than 26,000 nautical miles. The content of the survey included measurement of gravity, magnetic force, and depth of the ocean; collection of ocean floor samples, hydrological data, meteorological data, physico-chemical factors of sea water and the data concerning marine life; and observing and gathering data related to the island geology, morphology, and the living conditions and ecology of the islands and the reefs. As a result of this survey, various fields of science related to oceanography gained a large volume of firsthand materials. These materials have been analyzed and organized, and more than 40 investigative research papers and theses have been published.

The delegates who attended the symposium felt that, through the results obtained from this epochal work, we have a far better understanding of the central South Sea area, about its oceanographic structure and the distribution of the various resources. The survey results also provided valuable data for matters related to naval defense construction, maritime transportation and

communication, aquatic products and fishing, and exploitation of the various resources. These results are also highly valuable to the development of various fields of science related to oceanography. For example, the data gathered by the Oceanography of the South Sea Institute concerning the gravity, magnetic force and the depth of the ocean of the central South Sea area are very valuable to the understanding of the gravity and magnetic field characteristics of the area, the ocean floor topography, the sedimentation layer, the bedrock properties, the rift system, and the earth structure. They have further provided definitely valuable data for the research on geological structure and causes of the South Sea area, and for the clarification of the oil-gas distribution law of the area. In the field of marine life, the data gathered concerning the distribution of plankton, organisms of the bottom, roe and hatchlings in the South Sea area have provided the necessary basic data for the future development of the aquatic production resources of the area. The data concerning the island and reef animal and plant life of the Zhongsha and the Xisha archipelagos, their distribution characteristics, their species composition, and their numbers have also provided very valuable material for the future development and exploitation, as well as protection, of the rare marine animal and plant life. Besides this, they have also discovered a series of new species of animal and plant life in the central South Sea area, adding to the knowledge of the South Sea animal and plant life systems a rather rich content.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

SYMPOSIUM ON ECOLOGY, NEW ECOLOGY SOCIETY DISCUSSED

Hong Kong ZHONGGUO XINWEN in Chinese 14 Dec 79 p 7

[Text] Kunming, 13 Dec--Zhongguo Xinhuashe--A symposium on ecology was recently held in Kunming under the joint auspices of the Chinese Academy of Sciences and the China Forestry Society. The China Ecology Society was formally established on 1 December.

More than 130 delegates representing 26 provinces, cities and autonomous regions of this country attended the symposium.

This symposium was the first, unprecedented assembly of the ecology workers of this country. More than 120 theses and technical reports were presented at the symposium. The scientists exchanged the ecology-related scientific research results of the past several years, and discussed the directions and the tasks of ecological science education.

Enthusiastic discussions were unfolded, and various views and suggestions were presented by the delegates from all over the country throughout the symposium focusing on the problems related to the protection of our natural resources and their national exploitation, population growth, industrial-agricultural production and urban construction, together with various other important problems related to environmental protection.

They have elected the chairman, vice chairman, managing direction and secretary of the board of directors of the China Ecology Society.

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CSO: 4008

ARCHITECTURAL JOURNAL

AUTHOR: XIAO Tong [5135 2717]

ORG: None

TITLE: "Break Up the Old and Establish the New To Raise the Design Level Further"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 1-2

ABSTRACT: Architecture has very prolonged effects. Some structures are to be used for a century or longer. The quality of design affects not only the production and living of the people but their posterity as well. Foreign visitors of the past few years have proposed many problems and viewpoints with respect to Chinese architectural designs. First of these concerns constructing highrises and many architects object to China's construction of highrise apartments. Others raise the problem of Chinese traditional styles and the problem of preserving ancient structures. Partly as answers to these proposals and inquiries and partly for reviewing basic principles with which to improve the level of architectural designing in China, the author discusses the lessons learned in the past two to three decades of construction and items to be considered in the future.

AUTHOR: YAN Zixiang [7051 1311 4382]

ORG: None

TITLE: "Emancipate the Mind, Endeavor To Do Design Work Still Better"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 3-7, 47

ABSTRACT: This paper is an excerpt of the author's speech at the National Construction Inspection and Designing Work Conference on 22 Aug 79. The work of overseeing and designing construction projects in the past 30 years are briefly reviewed and the major responsibilities for the department in the period of readjustment of the next 3 years stated. The author suggests that in the next 4 months, some structures representing the construction of the past several years should be selected for analysis to determine the harmful effects of LIN Biao and the gang of four, a production increase and thrift movement should be launched to complete this year's plan in its entirety, the three-year plan should be revised and improved to raise the technical level, and the construction standard design of this year should be implemented.

AUTHOR: GONG Deshun [7895 1795 7311]

ORG: None

TITLE: "Crush the Mental Fetters and Raise the Design Level"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 8-10

TEXT OF ENGLISH ABSTRACT: In the first part of the article, the writer briefly viewed the history of the past three decades in retrospect and sufficiently affirmed the prominent achievements made by the architectural designers in the cause of socialist construction. At the same time, however, he also points out that the development of ideas of architectural design in the past thirty years has followed a zigzag road. Especially since 1966, LIN Biao and the gang of four had fastened on the designers many mental chains, and even now the influences still suffocate their minds and make them dare not create boldly. Therefore, the most important problem at present is to emancipate the mind, and only with this can the designers make more contributions to the realization of four modernizations.
Secondly, the writer suggests that in order to flourish the architectural creation, the leading cadres concerned should not only well handle the carrying out of party's policies and principles, but should also encourage and

[continuation of JIANZHU XUEBAO No 6, 1979 pp 8-10]

support the designers to create boldly. It is much to be regretted that in some regions and departments particular leading cadres mess things up by issuing subjective orders which has caused confusion of ideas among the architectural designers, thus obstructing them from bringing into play their enthusiasm and initiative. Moreover, stress should be laid on doing things in the light of scientific laws. The architectural design work needs its specific rules and regulations. Those procedures of capital construction which have all along proved effective but have been scrapped under the interference of the gang of four should be reestablished as soon as possible. Design criteria and quality indices of different building types should be enacted again and strictly observed.
Thirdly, the writer maintains that it is necessary to implement further the party's principle of "utility, economy, and aesthetic consideration when conditions permit." Design concept should be considered functionally, and the trend of blindly seeking after form without paying attention to function should be objected. But, under the interference of the gang of four the design personnel dared not talk about architectural style and plastic arts, and consequently at present there exists a trend of neglecting aesthetic considerations. In solving the problem of housing construction, it is necessary to employ standard structural members for affording possibilities of building mechanizations, but

[continuation of JIANZHU XUEBAO No 6, 1979 pp 8-10]

attention should also be paid to variety in design, so as to create lively and pleasant neighbourhood units. In public buildings different architectural styles should be developed freely and on the basis of studying and assimilating the Chinese architectural heritage the architects will be in a position to create new styles both with national characteristics and vernacular idioms.

AUTHOR: SHE Junnan [0152 3975 0589]

ORG: None

TITLE: "On Some Problems of Architectural Creation"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 11-13

TEXT OF ENGLISH ABSTRACT: This article deals with some problems concerning architectural creation. The main viewpoints are as follows:
First, the writer points out the importance of design conception. He holds that a good project is the fruit of repeated and painful efforts exerted in the course of conception activities. Through his own experience of creative practice, he expounds his viewpoint by means of concrete examples. These include the Chinese Embassy in West Germany, the Chinese Embassy in the Kingdom of Norway, and the proposed "Gooselake Hotel" in Guangzhou. The three projects mentioned above have all met with success solely because of cleverness of conception. For instance, in designing the Chinese Embassy in West Germany, the architect has made the best of the site; and in order to meet the needs of functional requirements, he has employed five courtyard units scattered in the woodland and connected with the Chinese traditional

[continuation of JIANZHU XUEBAO No 6, 1979 pp 11-13]

garden, and for this reason the design has been appreciated by German architects.

Secondly, the writer maintains that, in order to flourish architectural creation, it is necessary to implement the policy of "letting a hundred flowers blossom and a hundred schools of thought contend." In the field of architectural design, stress must also be laid on the carrying out of Chairman MAO's instruction: "Different forms and styles in art should develop freely and different schools in science should contend freely. We think that it is harmful to the growth of art and science if administrative measures are used to impose one particular style of art or school of thought and to ban another." At the same time, he argues that it is necessary for the architects to emancipate themselves from the stereotype of "national style" with big glazed-tile roofs as its characteristic. It is also held that the theory and practice of Chinese traditional gardens, which has enlightened the masters of Western contemporary architecture on the skill of spatial organization, is a rich heritage worth studying and carrying forward.

Thirdly, in order to effectively implement the party's principle of "utility, economy, and aesthetic consideration when conditions permit," stress should be on cultivating the type of study of "seeking truth from facts and proceeding from reality." In the writer's opinion, the most important thing in architectural design is to carefully consider the relationship between function and

[continuation of JIANZHU XUEBAO No 6, 1979 pp 11-13]

economy. Practice has shown that a compact plan which can effectively meet the functional and economical requirements more often than not generate a simple yet pleasing elevation and an architectural space appropriate in scale.

Moreover, the writer also points out that there are a large number of good examples in modern architecture abroad in handling the relationship between form and content, and emphasizing function and economy is one of the trends prevailing presently in architectural creation abroad. These experiences deserve the Chinese architects' study for well implementing the party's principle mentioned above.

AUTHOR: CHENG Taining [4453 3141 1337]
YE Xianghan [0673 3276 5496]
XU Dongping [1776 2639 1627]

ORG: None

TITLE: "Discussion on Architectural Design of Small and Medium-sized Buildings"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 14-20

TEXT OF ENGLISH ABSTRACT: In this article the writer puts forward his views on spatial composition of architectural ensembles composed of small and medium sized buildings as well as on the architectural design of these individual buildings. The writer holds that:
(1) The organic connection between a lot of building groups in a city forms a continuous flowing space. This spatial organization of building groups often gives one a deep impression, which by and large determines the appearance of the urban scene. As for medium and small sized cities, since the masses of buildings are comparatively small, what attracts one first is usually not the images of individual buildings but the visual interest of the spatial composition of a whole building group. Therefore, it is necessary to strengthen the unified leadership of city-planning, and on this condition use of diversified and freely planned spatial compositions in combination with the city's func-

[continuation of JIANZHU XUEBAO No 6, 1979 pp 14-20]

tional requirements and natural surroundings should be encouraged.
(2) The design of individual buildings must accord with the spatial composition of the building group. In particular, attention should be paid to the coordination between the modelling, massing, and scaling of the buildings so as to achieve a unity of streetscape. Moreover, the configuration and facade treatment of small and medium sized buildings should be as simple as possible, and it is necessary to attain a lively and unified effect of spatial composition through an organic relationship in plan and height between the buildings.
The writer has cited some examples to elucidate his views.

AUTHOR: ZHANG Kaiji [1728 7030 3444]

ORG: None

TITLE: "Comments on the Front-Three-Gates Highrise Flat Blocks"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 21-25

TEXT OF ENGLISH ABSTRACT: This article first affirms the achievements of the Front-three-gates Highrise Flat Blocks, Beijing, in siting, saving land, selection of structural systems and diversity of housing design, and it also points out some problems and shortcomings existing in this project.
(1) In the slab blocks, the access galleries are too long, being generally 20 to 30 meters. This is due to the inadquate provision of lifts, generally with only one lift serving 9 flats on each floor. Another shortcoming is that most of the access galleries were planned along the north external walls, thus heavily destroying the force-transmitting system of shear walls and resulting in great irrationality in structure. If cantilevered galleries had been employed, this defect could have been avoided.
(2) In the tower blocks, the provision of lifts is not adequate too. There is only one lift even in the 15-story blocks. Moreover, each floor generally has one or two flats with unsatisfactory orientation.

[continuation of JIANZHU XUEBAO No 6, 1979 pp 21-25]

(3) The facade treatment of the blocks is quite clean and neat on the whole. However, it is much to be regretted that a large number of access galleries have not been reflected on the facades, and if they had been designed in an open yet not enclosed manner, the north facades might have achieved more lively architectural effect.
The writer also holds that structurally the highrise flat block is more expensive in construction cost than the multi-story one, and therefore, it is advisable to set up fewer highrise blocks, especially tower blocks.

AUTHOR: SHEN Yadi [3088 0068 6611]

ORG: None

TITLE: "Modernization of City Construction as Seen From the Front-Three-Gates Housing Construction"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 25-27

ABSTRACT: The Front-Three-Gates housing development includes two rows of 9-16 storied highrises providing about 400,000 m^2 of floor spaces for residences and 100,000 m^2 for offices, hotels, commercial and service industries, and middle and elementary schools. Construction of all these were completed within a short period of 2 years to make the project a great achievement, but in utilization some problems do exist. This paper traces the history of urban development since the ancient times and divides it into four generations: (1) Stores lined both sides of the main street, with residences behind the stores. (2) After the 1950's, the buildings on the main thoroughfare became taller and the street was widened but the crowding and confusion remained. (3) In many cities of the world, pedestrian bridges, underground passes, and courtyards between buildings emerged in the 1960's.

[continuation of JIANZHU XUEBAO No 6, 1979 pp 25-27]

(4) Three dimensional or stereo arrangement of streets divides vehicle and pedestrian traffic into two different levels. Stores and public services are placed in the middle with streets on both sides to improve efficiency and to provide more green spaces. The design of a London project is described to illustrate the author's idea of a fourth generation, or modern urban planning. Unlike the old concept, which has been adopted by the Front-Three-Gates, streets are not merely for dividing up the buildings. To be modern, attention should be focused on indoor and outdoor spatial arrangement for the improvement of environment. The Chinese ancient style of using gardens to link and separat spaces may be adopted and developed in the realization of modernization of the urban environment.

AUTHOR: SHEN Jiren [3088 4949 0088]

ORG: None

TITLE: "Opinions About the Front-Three-Gates Housing Construction"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 p 28

ABSTRACT: The newly completed highrise housing project of Front-Three-Gates of Beijing helped to expose the many serious problems existing in the urban planning work in the capital. Of these problems, the following are briefly discussed: (1)After the long term development plan for Beijing was interrupted by the gang of four, it has never been revived and the present confusion of design is the result. (2) The guiding principle remains the old concept of constructing buildings along planned streets without any consideration of the city traffic, the noise, the environment, and the unity of the plain, the lines, and the points. (3) Although many designing and construction units participated in the project, what was approved by the leaders turned out to be the same all over. Tomorrow's West-Two-Circles will perhaps be just another Front-Three-Gates. (4) There are no regulations or laws to enforce objective principles of construction and maintenance. With all its many defects, Front-Three-Gates is now a place to live. But what will it be like in 3-5 years?

AUTHOR: ZHU Zongyan [2612 1350 1750]

ORG: None

TITLE: "Discussing the Front-Three-Gates Housing Development, With Some Suggestions on Residential Design"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 p 29

ABSTRACT: In view of street planning, some highrises are linked together in some places to cause the enclosed areas to be too long, as long as 155 m. The sunlight thus cannot penetrate and the ice and snow do not melt easily. All residences are located above the fifth floor, but the stairway instead of the elevator entrances is emphasized. In horizontal arrangement, 7-8 turns are required to reach the doors of the apartments. In order to provide separate bedrooms for members of a family and a sitting room for studying, entertaining guests, serving meals, and watching television, a combination traffic hall and living room is suggested as a possible solution.

AUTHOR: WANG Jiqing [3769 1323 0615]

ORG: Acoustics Research Laboratory, Tongji Univ[illegible]ty [Shanghai]

TITLE: "Acoustical Design of TV Studio"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, No 79 pp 30-35

ABSTRACT: Acoustical requirement of a TV studio is the same as that of a radio broadcasting studio, but the area of the former must be considerably larger. A medium sized TV studio should have 400-600 m^2 of floor space, and about 5000 m^3 in volume. In China, the largest ones, such as Tianjin and Changsha Studios, have 10,000 m^3, and are in the process of growing even larger. In some programs, it is necessary that the microphone must not be visible on the body of actors and actresses, who are, moreover, constantly moving about in the show. For all these reasons, a TV studio design involves special acoustical problems. Various possibilities of improving the acoustical quality of TV studios and of controlling the noise of the ventilation system are described. References include several publications of the British Broadcasting Company.

AUTHOR: WANG Huabin [3769 5478 1755]
ZHANG Zugang [1728 4371 0474]
SUN Dazhang [1327 1129 4545]

ORG: None

TITLE: "Architecture in Switzerland"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 36-45

ABSTRACT: In June 1979 the authors visited Switzerland at the invitation of the Swiss Association of Architects. The visit covered 6 large cities and 10 nearby townships. Due to the fact that the country is a small federation of many nationalities speaking many languages, it is difficult to find a unified national architectural style, but cities are always built in a natural environment of river bends, with lakes, alpine mountains, and large forests nearby. After the WWII, there was a period of 30 years of unprecedented construction to reach a climax in 1972-73. The crisis economic situation throughout Europe since 1974 has had such an adverse effect on Switzerland that the decline in construction has not yet be reversed. Photos and ground plans are included in the paper to describe architectural designs of schools, churches, hotels, etc. of that country and its policy of preserving ancient structures.

AUTHOR: ZHANG Kehan [1728 0344 3352]

ORG: None

TITLE: "The Fengtai Department Store"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 46-47

ABSTRACT: The department store is located in the middle of the busiest street in Fengtai, with the Fengtai Railway Station as its westside neighbor. Its warehouse storage is placed in the cellar. The first and second floors are retail spaces, with offices and single employees dormitories on the third. Restrooms and lounges are provided in the spaces under the staircases. This arrangement causes all the needed facilities to be encased in a single rectangular structure providing 5124 m^2 of construction area to save ground space. It is located on a thoroughfare but not at an intersection to simplify security management, while freight elevator in the rear of the building supplies merchandise bins along the walls once a day. Windows above these bins provide natural ventilation and lighting during the day to save the cost of maintenance. Photos and ground plans of the department store are included in the description.

AUTHOR: None

ORG: None

TITLE: "Selected Design Projects for Urban Housing"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 48-56

TEXT OF ENGLISH ABSTRACT: In order to raise the design level of urban housing and promote the development of building industrialization, the architectural Society of China and the Building Science and Technology Bureau under the State Capital Construction Commission jointly sponsored a countrywide competition of design projects for urban housing. The principal requirements include: (1) The flat blocks should be mainly of 4 to 6 stories and suitable for the housing construction of large and medium sized cities as well as industrial areas. (2) Three kinds of standard on average floor space per household namely 42, 45, and 50 m^2, specified by the State Capital Construction Commission should be observed. (3) Enlarge the percentage of 2-room and 3-room flats, and pay attention to saving land. (4) The principle of "utility, economy, and aesthetic consideration when conditions permit" should be embodied in the design, and advanced technology, including new structural systems and new build-

[continuation of JIANZHU XUEBAO No 6, 79 pp 48-56]

ing materials should be employed as far as possible. (5) Adaptability to different orientations and flexibility of arrangment in the general layout of a residential quarter should also be considered.
In this issue selected design projects submitted to the countrywide competition by some provinces, municipalities, and autonomous regions have been illustrated.

AUTHOR: ZHANG Jiaji [1728 1367 7535]

ORG: None

TITLE: "On Wooden Bracket Clusters [Dougong] in Chinese Traditional Architecture"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 57-60

ABSTRACT: Dougong is one of the characteristic structures of Chinese architecture. Beside being an artistic form, it was always used as a mark of political rank and authority as well. In the period of more than 1000 years from the Qin Han To The Tang Song dynasty, the construction of formal and ceremonial structures remained the system of inner and outer pillars, while Dougong was the necessary member of the framework. Dou is a square block of wood, with small grooves on which to place a small horizontal piece of wood which is called Gong. Dougong together form the member between the pillar and the beam. Various ways of using this wooden bracket member to create variations of spans and overhangs and to improve the strength of the load-bearing beams are described. Drawings of several Buddhist temples in Shanxi and Hebei Provinces demonstrate this style of roof construction.

AUTHOR: XIE Shunjia [6200 7311 0163]

ORG: None

TITLE: "Some Suggestions About Hotel Building Design"

SOURCE: Beijing JIANZHU XUEBAO [ARCHITECTURAL JOURNAL] in Chinese No 6, Nov 79 pp 61-62

ABSTRACT: The author, a Hong Kong resident of Chinese ancestry writes about his own views concerning hotel design after he has read the paper, "On Several Problems of Hotel Construction Design" in No 4, 78 of JIANZHU XUEBAO and after he has seen several hotels in China during his visits. He objects to the system of dividing hotels into different classes for different visitors. Systems of heating, interior decoration, lighting, plumbing should be improved. The ceilings of public activity rooms, such as the dining rooms, the reception halls, and banquet halls, etc. are too high for efficient heating, cooling, lighting, and maintenance. Dormitories of employees should not be a part of the hotel. Department stores for foreign visitors are too far away from the hotels. The hot water supply lines are too long and the pipes are not insulated which causes a great deal of heat loss. In a hotel in Yan'an the hot water tank is in a building which is 9 minutes walk away from the building which houses the guestrooms.

6168
CSO: 4009

SCIENTIFIC EXPERIMENT

AUTHOR: SHANG Guo [0794 0948]

ORG: None

TITLE: "China's Modernized Aviation Harbor--The Passenger Lounge Building of the Capital International Airport"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, 1979 pp 1-4, front and inside front covers

ABSTRACT: The Capital International Airport was constructed in the 1950's, with its original runways designed for the take-off and landing of aircrafts weighing 120 tons. The operation's building had an area of 10,470 m^2, with communication and guidance equipment of the technological level of that period of time. Modernization of the facilities of that airport was one of the emphasized items of Premier Zhou before his death. This paper describes the completed new airport, with updated as well as enlarged structures. There is a drawing of the ground layout and a chart showing passenger and baggage flow patterns. The front cover of this issue is a drawing depicting the aerial view of the airport. Photos showing interior scenes are reproduced on the inside front cover.

AUTHOR: TIAN Shixiu [3944 2514 4423]

ORG: Institute of Sonics, Chinese Academy of Sciences

TITLE: "Linguistic Sonics"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, 1979 pp 5-7

ABSTRACT: Voice control of mechanical devices has been the dream of men for a long time. YANG Wulian [2799 0523 1670] of Tang Dynasty made a wooden Buddha that would say Bushi when the cup in his hands was full of money, and there was the story of "open sesame" in Arabian Nights. The current condition of development in voice coder, voice command device, voice print, etc. is discussed. Further development of these techniques may make it possible for a typewriter to operate by a voice code; in other words, future machines may be equipped with ears. There will be no need for translators. A machine will listen to one language and process it into another. The voice print technique will be able to identify an individual by his voice. Machines capable of reading out books automatically for the blind are already being marked in foreign countries.

AUTHOR: HU Danning [5170 6130 1380]

ORG: None

TITLE: "How is Severe Myopia Inherited?"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, 1979 pp 8-10

ABSTRACT: Severe and mild nearsightedness are two different type of diseases. In the former, not only vision is limited to a shorter than normal distance, a disorder also often exists in the base of the eyes and other concurrent eye diseases can easily occur. This is a form of congenital anomaly inherited through recessive genes. From 1972 to 1978, the author and colleagues carried out an investigation of family histories of several tens of severely nearsighted persons. The incidence of this disease between males and females was found to be similar, while the disease was found to be rarely carried on from one generation to the next. In majority of the cases, parents of a victim of severe myopia do not suffer from this condition, and less than half of the children of such a victim become nearsighted if he or she does not marry a severely nearsighted person. Details of the survey are reported.

AUTHOR: SHI Haoqun [2457 7729 5028]

ORG: None

TITLE: "Mother-daughter Ship Transportation"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, 1979 pp 10-11

ABSTRACT: The LASH [lighter aboard ship] system of handling ocean-going cargoes is described in the paper as a mother-daughter ship transportation system. This new material handling method appeared in the early 1970's. Container-carrying barges are placed on ocean-going large ships to be hoisted and discharged, barge and containers and all, at the destination so that the barge can navigate in shallow water or up the streams to bring the container to its final destination or to be transferred directly onto rails or trucks for further transport. In order to improve the efficiency of the LASH system, the author maintains, the barges must be well organized and new equipment must be designed to coordinate with the established container system.

AUTHOR: SONG Shaozong [1345 4801 1350]

ORG: Beijing Research Institute of Textiles

TITLE: "Nonwoven Fabrics"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, 1979 pp 12-13

ABSTRACT: Following a brief introduction of such new techniques as shuttleless looms, spindleless spinning, static electricity spinning, multi-phase weavers, etc. the paper proceeds to discuss the development of nonwoven fabrics in the past decade. In 1961, there were only twenty-nine thousand tons of nonwoven fabric products in the U.S.A. and thirty-four thousand tons in the world. It is estimated that there will be more than four hundred thousand tons of such products in 1980. The three major types of mechanical, laminating, and mixed techniques of making nonwoven fabrics are described. The author believes that in the future a procedure will be created to spray material onto a clothing form in one step and the processes of spining, weaving, knitting, or sewing will all be outdated.

AUTHOR: FANG Zhi [2455 4249]

ORG: None

TITLE: "Man-made Celestial Bodies Return to Parent's Home"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, 1979 pp 14-15, 17

ABSTRACT: In the past 20 years, more than six thousand man-made celestial bodies have fallen back onto the earth. In rare cases, such as a cow in Cuba in 1962, an animal was hurt or a piece was observed flying down from the sky, but generally speaking they did not make sensational news until 24 Jan 78 when Cosmos-954, which carried a small nuclear reactor, fell and caused nuclear pollution. The various reasons which may cause man-made satellites to fall back to earth unexpectedly are discussed. Problems relating to the precise estimation of the life of an artificial satellite and the landing location of unburned pieces are also examined.

AUTHOR: LI Xiaoqing [2621 2556 0615]

ORG: Zijinshan Astronomical Observatory

TITLE: "Stellar Whirlwind"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 16-17

ABSTRACT: This paper tells the current understandings with respect to the various stages of stellar evolution, from birth, to a yong star, to white dwarf star, to neutron star, to black hole, while some gaseous particles escape, which are capable of recondensing to start a new generation of the evolutionary process. In a very vague manner, the author attempts to relate the observation of extremely low content of gaseous matter in a certain unnamed elliptical galaxy which is said to be similar to the milky Way, however. The author says that winds occur easily in that elliptical galaxy. Movement of the gases produces the wind, and an acceleration of the movement produces whirlwind, which is said to have destoryed many a young star in that galaxy. The paper is supposed to use these facts to support the law of conservation of matter and the principle of continuous evolution.

AUTHOR: XIANG Zhenxi [4161 6297 3886]

ORG: Zhujiang Metallurgical Plant

TITLE: "King of Magnetic Materials"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 18-19

ABSTRACT: Rare-earth-cobalt magnets ($RECO_5$] first appeared ten years ago. Their coercive forces are ten times that of ordinary magnets and twice that of platinum-cobalt magnets which had been regarded to be the best. Starting with the atomic and molecular structure of rare-earth-cobalt crystal, this paper explains the reason why this type of permanent magnet is the king of all magnets. Applications of rare-earth-cobalt magnets in microwave technology, in electrical motors, in bearings, and in medicine are also briefly introduced.

AUTHOR: ZHU Chengyong [2612 2110 3057]

ORG: None

TITLE: "A New and Attractive Method of Metal Treatment--Ion Implantation of Metallic Materials"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 22-23

ABSTRACT: It is well known that techniques of alloying cause metals to be harder and more abrasion and corrosion resistant. In the past few years, a new technique, ion implantation, has been created to treat the surface of alloys to improve their corrosion resistance still further. This techque was first systematically studied in England in 1970. In 1975, the United States formally announced the adoption of chromium ion implantation in carbon steel. Today, the technique is being studied in Western European countries and Japan as well. The machine used to inject high speed ions of carbon, nitrogen, etc. into ion or steel and advantages of this technique are explained. Future possibility of using this technique to produce noncrystalline metals (metallic glass) is also discussed.

AUTHOR: SUN Lie [1327 4539 6166]

ORG: None

TITLE: "Ground Noise and Earthquake"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 24-25

ABSTRACT: A few hours before the Tangshan Earthquake, inhabitants of the region of Beijing-Tianjin-Tangshan were awakened by very loud noises, much like ten thousand horses passing by their homes. Noises of "wind, thunder, and hundreds of birds" were heard for several days before the 1970 earthquake in Tonghai of Yunnan Province. Although understandings are not yet sufficient, according to preliminary analyses, these noises are perhaps caused by rupture of rocks. This paper discusses the possibility of using precision sound recording and amplification systems to "listen" to the ground noise in wavelengths inaudible to men for the purpose of forecasting earthquake. Currently, various types of sonic signals recorded by such systems are being studied in China. Perhaps in the future techniques will be developed to process these data or to recognize frequency changes so as to form bases for determining the location, the time, and the magnitude of earthquakes.

AUTHOR: ZHAO Dianwu [6392 3013 0063]
YU Wentao [0151 2429 3447]

ORG: None

TITLE: "Acid Rain"

SOUCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 37-39

ABSTRACT: Rain and snow are not just common natural phenomena, they are also inherent parts of human livelihood. They have been understood to be related to the origin of life and have been known in folk sayings to be forerunners of bountiful harvests. In some areas, the situation had all been changed since WWII. In the night of 23 Sep 71, acid rain causing pain to the eyes and the skin was reported in Tokyo, but as a matter of fact, the same phenomenon had occurred in England, the northern part of the U.S.A. and industrialized countries of Europe since the 1950's with increasing frequency. The acid rain in Japan was more irritating because instead of sulfur dioxide, it was primarily caused by nitric acid pollution of the air. Possible damage to fishes in the lakes and rivers, trees in the forests, metal and other materials used for construction by rainwater containing either sulfuric or nitric acid and air pollution as the primary cause of acid rain are explained.

AUTHOR: ZHOU Wansong [0719 8001 2646]

ORG: None

TITLE: "Magnetism and Medicine"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 44-45

ABSTRACT: The use of magnetic field for the treatment of diseases has had a history of more than two thousand years in China. One of the 5 rocks prescribed to the king of Qi was a magnetic rock. Actions of a magnetic field include relieving pain, inflammation, edema, diarrhea, and pressure. The theory of magnetic therapy is also related to acupuncture points. When a piece of magnetized material is applied to a selected point of the body, a sensation of warmth, chill, numbness, etc. may be felt to spread from that point along an acupuncture meridian. Current studies indicate that these phenomena are related to certain enzymes of the body. Magnetic field may also be used for anaesthesia, to extract foreign substance, to isolate red blood cells in the laboratory, and to aid x-ray and EKG diagnostic procedures.

AUTHOR: None

ORG: None

TITLE: "New Gardens of Science and Technology"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 11, Nov 79 pp 46-47

ABSTRACT: Six short items are included in this column: (1) China's first large oceanic remote control hydrology and weather station: With the support of related organizations, Shandong Provincial Institute of Instruments and Meters has successfully made it after 3 years of hard work. This floating instrument station requires no human operators. In the region of the sea, it can automatically measure such hydrological factors as the water temperature, the salinity, the flow speed, etc. and the weather factors as the atmospheric humidity, wind speed, wind direction, etc. and convert the data into electrical signals and transmit them to the coastal receiving station. (2) Y391 yarn elasticity measuring instrument: The instrument is the result of joint research by Changzhou Second Textile Machine Plant and Shanghai Academy of Textile Research. It can determine the tensile and load elasticity of chemical and natural yarns in both dry and wet conditions. (3) Underwater partially drained semi-automatic welding: This technique has become necessary with the development of ocean floor oil and gas mining industires. On the basis of analyzing the condition of development of such techniques in foreign countries, the Harbin Institute of Welding Technology, Oceanic Petroleum Survey Center, and Shanghai Salvaging Bureau jointly designed and made a complete set of equipment to perform this work. (4) Reflect-type laser goggles: The film used to coat eyeglasses to cause them to reflect laser for eye protection has been successfully made by Shandong University. (5) Light cordierite refractory materials: The ceramic fiber and the light weight foam refractory materials, having a thermal stability of 1300°C and a pressure resistance of 78.2 kg/cm^2 have been successfully made by Zibo Municipal Institute of Silicates of Shandong Province by using cordierite as the binding material. (6) Contraction-free filler sand: A filler sand made of ordinary cement, sand, iron filings, sodium chloride, and perhydrol ash has been produced by the Science Research Institute of the First Engineering Bureau of the State's Construction Committee. The expansion of the iron granules can compensate for the contraction of the cement in the process of solidifying and hardening.

6168
CSO: 4009

AUTHOR: LIU Houyi [0491 0683 0001]
LIU Qiusheng [0491 4428 3932]

ORG: None

TITLE: "Awakening the Chinese Pithecanthropus--a Report of Professor PEI Wenzhong [5952 2429 0022]"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 1-3

ABSTRACT: This paper is a brief story of the life of Professor PEI who discovered the fossil remains of Peking Man in the fall of 1929. Archaeological digging work beginning in 1927 is reviewed. In the summer of 1935, he went to Paris for graduate study and returned after the liberation. During the cultural revolution, his Ph.D. degree from University of Paris and his honorary membership of British Royal Society earned him the big hat of "reactionary authoritarian." He calmly withstood all the criticisms and appreciated the warm support of Premier ZHOU. Today, after the defeat of the gang of four, the 75 year old professor leads young scientists to inspect many paleolithic diggings of the Northeast and North China, to attend scientific discussion meetings, and to write research papers for several journals. His recent paper in KEXUE TONGBAO (No 12, 1978) won very favorable reviews from scientists here as well as in Japan.

AUTHOR: LIU FENGE [0491 7364 1230]
XU Xing [1776 5281]

ORG: None

TITLE: "The Ship Daqinghe, Capable of Drinking Oil Pollution"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 4-6

ABSTRACT: According to survey reports of the Bohai [Pohai or Gulf of Chihli] region, petroleum contents were detected in 70 percent of water specimens in 1974 and in 1976 in all specimens. Many spawning grounds in the sea have been destroyed and yields of many fish and shellfish species dropped considerably. The major cause of oil pollution is the discharge of polluted water from ships. For example, the water used to wash the cabins contains 24,000-200,000 ppm of oil. The ship Daqinghe was reconstructed from an oil tanker and began in operation in Jan 79. It has a capacity of treating 300 tons of waste water per hour. Following treatment in Daqinghe, the oil is reclaimed, while the water contains less than 5 ppm of oil. Because of the highly efficient treatment process, to clean a thousand-ton tanker requires only 7 days instead of a whole month in the past. The oil-filtering equipment of Daqinghe is briefly described.

AUTHOR: QIAO Tingkun [0829 1694 2492]

ORG: Beijing Fourth Pharmaceutical Plant

TITLE: "A New Drug for Prevention and Treatment of Hepatitis--Yiganling"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 p 6

ABSTRACT: After many years of research and clinical experimentation, the new drug for the prevention and treatment of hepatitis, Yiganling, is finally available on the market. This product of the Beijing Fourth Pharmaceutical Plant is made from the seeds of Shuifeiji [Silybum marianum Caertn.] a species introduced to China about 40 years ago from Southern Europe as an ornamental plant. A large quantity of studies on the cultivation, chemistry, pharmacology, an clinology of this species have been compiled into a book BAOGAN YAOYONG ZHI-WU SHUIFEIJI DE ZONGHE LIYONG, soon to be published by Kexue Chuban She. Clinical tests have proved the effectivenss of the new drug, Tabella Yiganling on protracted, chronic, and acute hepatitis, on occupational and sleeping pill damaged liver, and other forms of liver and gall bladder diseases. Plans are being carried out to test its use for protecting those in constant contact with x-ray and for treating certain diseases of the nervous system. Each tablet of Yiganling contains 38.5 mg of Silymarin which is the effective element of the plant.

AUTHOR: YAN Qixiang [7051 0796 5046]

ORG: None

TITLE: "The Most in Metals"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 14-15

ABSTRACT: This paper describes briefly the history of discovery, the properties, and the applications of lithum, which is the lightest of all metals, osmium, which is the heaviest, tungsten, which is the most difficult to melt, chromium, which is the hardest, cesium, which is the softest and easiest to melt, titanium, which is the most durable, and niobium, which is the most corrosion resistant.

AUTHOR: WANG Zhongxing [3769 0022 5281]

ORG: Research Academy of Colored Metals, Ministry of Metallurgical Industry

TITLE: "Superconducting Materials, Just Beginning to Show Brilliancy"

SOURCE: Beijing KEXUE SHIYAN [SCEINTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 16-19

ABSTRACT: The strange phenomenon of superconductivity, which is a property of many materials, alloys, and chemical compounds at temperatures near absolute zero by virtue of which their electrical resistivity vanishes and they become strongly diamagnetic, is described. Among many materials that have been discovered to possess the property of superconductivity, only three of these, the niobium-titanium alloy, the niobium-tin alloy, and the vanadium-gallium compound, have practical applications at present, and under direct current condition only. Multi-element alloys and various metallurgical processes are being tested to reduce alternate current loss of materials, but these attempts are successful under low freqencies at present. Under high frequency and alternate current, the use of superconducting materials remains a subject demanding further studies.

AUTHOR: ZHOU Fuxiang [0719 1381 4382]

ORG: None

TITLE: "Mankind's Spaceship--A Few Words About Ecology"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 18-20, 25

ABSTRACT: The life-supporting system of all spaceships is designed as a simulation of the natural environment in which human beings live. As a matter of fact, space science studies the earth and its surrounding environment because the earth serves as a spaceship for the human race. The publication of Rachel Carson's SILENT SPRING in 1962 warned the world about the potential danger of environmental pollution which may ultimately destroy the spaceship earth. Effects of air and water pollution, including the conversion of inorganic mercury into methyl mercury by bacteria of the natural environment and the frightening power of living organisms to concentrate methyl mercury, are discussed. Mercury poison diseases of adults, children, and fetuses and the importance of environmental protection in the process of industrialization form the essential part of discussion of this paper.

AUTHOR: CUI Qinwei [1508 2953 3555]

ORG: None

TITLE: "A Curious Flower of the Garden of Medicine--The Technique of Far-Infrared Therapy"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 21-22

ABSTRACT: In the bitter winter of 1976, some workers of a certain printing shop in Shanghai, suffering from chronic frostbite gangrenes on hands and feet, discovered that the sores suddenly disappeared without treatment. Following investigation, it was the general conclusion that the sudden healing may have been related to the fact that a new far-infrared heating device had just been installed and these workers had tried to warm their hands and feet in front of the device for several days before healing occurred. The physicians of the plant brought other frostbite victims to the plant to test the healing power of the device, and all were cured within 5-10 days. Since then, far-infrared therapy has been tried to treat diseases of the upper respiratory tract, skin diseases, traumatic edema, chronic nephritis, gastroduodenal ulcers, elephantiasis, etc. The therapeutic effect of far-infrared radiation is being studied in preparation of testing it on cancer.

AUTHOR: None

ORG: Radiation Protection Department, Beijing Municipal Public Health and Epidemic Prevention Station

TITLE: "Safety Protection in X-Ray Flaw Detection Work"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 p 23

ABSTRACT: Since the discovery of the ability of x-ray to penetrate the surface of materials 93 years ago, it has been used to observe the condition of the internal structure of men and materials as a woundless inspection technique. The strength of x-ray decreases with the density of material being penetrated, while the capability of x-ray to penetrate the material increases with the external voltage. When the human body is exposed to an excessive dosage of x-ray, serious damages will occur to the blood and other organs. Three protective techniques: proper shields, safety distance, and maximum duration of exposure, are discussed. Those who work with x-ray should also have periodical physical examination as a measure to protect their health.

AUTHOR: (1) SONG Yichang [1345 1355 2490]
(2) GUO Rensong [6751 0088 2646]

ORG: None

TITLE: "(1) Development of Strategic Bombers; (2) A Flame-Spitting Weapon--the Flamethrower"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 24-27

ABSTRACT: (1) The B-1 bomber is designed as the final generation of manned bombing aircraft by Rockwell International at a tremendous capital expenditure. Although its production had been unfortunately discontinued, it remained a superior creation of modern weaponry. Its engine, equipment, and capability are described and illustrated with drawings. (2) This paper begins with a description of a day during the "defensive attack" on the Sino-Vietnamese border. When soldiers of the Chinese People's Liberation Army came upon some Vietnamese soldiers firing automatic weapons inside of protective structures and trenches, the Chinese soldiers quickly used their flamethrowers, which destroyed the protective structures of the enemy instantly. The structure, the function, and the different types of flamethrowers form the major contents of the paper. The shortcomings of flamethrowers include the weight, the low fuel utilization rate, its short project distance and duration, etc. Further improvement and perfection are predicted.

AUTHOR: HUANGFU Dexing [4106-3940 1795 5281]

ORG: None

TITLE: "A New Type of Water Storage Engineering--Underground Reservoir"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 30-32

ABSTRACT: Time and space distribution of natural precipitation is never balanced, while human production and livelihood depend upon a constant supply of water. A water shortage of 400 km^3 in 1972 caused a worldwide food shortage and served as a reminder of the ineffectiveness of ordinary reservoirs. Underground reservoirs are a new engineering development of recent years. According to completed structures here and abroad, there are the two types of underground reservoirs with dams and without dams. The former are located under steep slopes in front of mountains; the latter in ancient stream channels on the plains. Forms of water storage under the ground surface, relationship of the technique of underground water storage with the plan of diverting water from South to North China, and the advantages of underground reservors and the problems involved are discussed.

AUTHOR: TONG Changliang [4547 5951 0081]

ORG: None

TITLE: "Vision of Animals"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 33-35

ABSTRACT: Eyes of mammals, birds, reptiles, amphibians, and fishes basically belong to the same type, while those of arthropods, including insects, crabs, etc. belong to a different type. Cephalopods of Mollusca have another type of eyes. All 3 types of eyes may be said to be wonderful cameras, better designed than any type made by men. The structure and the principle of regulation of eyes of the 3 types are described separately in the paper.

AUTHOR: None

ORG: None

TITLE: "Garden of Sciences and Technology"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 36-37

ABSTRACT: This paper contains six short items: (1) Ammonia-air Fuel Battery: It has been successfully made by Wuhan University, Wuhan Post and Telegraphic Research Academy of the Ministry of Telecommunication, and the 535 Plant using aqueous ammonia as the fuel to convert chemical energy into electrical energy. (2) Natural Silk Man-made Blood Vessels: Zhongshan Hospital of Shanghai First College of Medicine, Technical Research Institute of Shanghai Municipal Silk Company, and Shanghai Silk Specimen Testing Plant began the project in Apr 57 and the products have been clinically applied since Aug 57. In the 20 years, more than 200 patients have been cured by these blood vessels; nine of these have survived more than 10-15 years. (3) Amino-methyl High Efficient Fire-extinguishing Agent: It is a product of joint research by Shenyang Municipal Wood and Chemical Plant and Liaoning Provincial Fire and Security Team. It has been certified as a tasteless, poisonless, highly efficient, quick acting, and low cost fire-extinguishing chemical, and will be mass produced within a year. (4) Miniature Integrated Circuit Digital Electrical Meter: The PZ38 DC Integrated Circuit Digital Electrical Meter has been successfully made by

[continuation of KEXUE SHIYAN No 12, 1979 pp 36-37]

Shanghai Electrical Meter Plant most recently. It is broadly applicable in automatic control, data process, and electronic computer systems. (5) Electronic computer used in Computing Results of Higher Education Examination: The work of computing the results of higher education examination of close to ten thousand students in Kaifeng City was accomplished by using a long distance terminal of an electronic computer. Five persons finished the work in a few minutes. The same job was performed by 40 persons working 3 days and 3 nights in 1977. (6) Sun and Weather Colorfast Meter: Using artificially simulated sunlight, wind, rain, and temperature and humidity variations, the Changzhou Textile Instrument Plant successfully tested its new product, the Y581 Sun and Weather Colorfast Meter. With this instrument, it takes only about 80 hours to determine whether or not the colorfast condition of a dyed fabric meets the standard of the state.

AUTHOR: JIANG Wenhan [1203 2429 3352]

ORG: Institute of Photoelectric Technology, Chinese Academy of Science

TITLE: "A New Optical Technology--Self-Adjusting Optics"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 pp 40-41

ABSTRACT: This paper first explains the theory of telescope and the reason why telescopic lens of larger and larger diameter is needed to view targets of farther and farther distances. Although the problems of atmospheric interference may be resolved by placing telescope on artificial satellites, the weight of large telescopic lenses becomes a new obstacle. This paper explains the need for a self-adjusting optical system and the so-called new generation of compound telescopic lens, which is a complex system of six or more lenses of 1.8 m, weighing 3.5 tons. A single lens of a diameter of 4.5 m of identical capacity would weigh 18 tons. The theory of such a self-adjusting compound telescopic lens and its future prospect are explained.

AUTHOR: BAO Yunqiao [7637 0061 2881]

ORG: None

TITLE: "Fossil Nuclear Reactor"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 p 43

ABSTRACT: This paper tells the story of the discovery of some abnormal uranium ore in a French laboratory in 1972. The average U-235 content of this ore is only 0.62-0.296 percent, instead of the normal 0.72 percent. At first it was suspected that someone had mixed some reactor waste material in the ore. Careful investigation of the African mine from which the ore was produced revealed that this ore is in fact fossil remains of some natural spontaneous nuclear fission eighteen hundred million years ago. In June 1975, a special international conference was organized to study this rare phenomenon. Current understandings of the specialists on the subject and related puzzles yet to be resolved are discussed.

AUTHOR: None

ORG: None

TITLE: "Front, Inside Front, Inside Back, and Back Covers"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 12, Dec 79 front, inside front, inside back, back covers

ABSTRACT: The front cover is a picture of an imaginary cylindrical space-city of the future. The inside front cover contains 7 photos of (1) A multi-channel remote control hoisting truck (model) made by 2 students of the 26th Middle School of Shijiazhuang City, Hebei Province; (2) Handwritten scroll by YE Jianying [0673 0494 5391] to decorate the hallof National Young People's Scientific and Technological Products; (3) Airplane with umbrella-shaped wings capable of laying electrical cables made by 88th Middle School of Shenyang City; (4) Several Types of Solar Furnaces; (5) Model cruiser with 2 floats; (6) 12" visual telephone; (7) a small planetarium. The inside back cover contains 4 photos of astronomical instruments designed and made in China: (1) A large artificial satellite tracking camera; (2) a hydrogen atom clock; (3) A vacuum photographing dome. (4) a photoelectric astrolabe. The back cover is a calender of 1980, decorated with drawings of future moon-Mars spaceship, future wall-hanging television screen, high speed train, supersonic airplane, deepsea submarine, and visual telephone.

END

END OF FICHE DATE FILMED

March 7, 1980

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